RAILROAD GAZETTE

FRIDAY, MAY 24.

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Contributions.

Counterbalancing Locomotives.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to your editorial April 12, 1889, on over counterbalancing locomotive driving wheels, I note some statements which it is difficult to reconcile with ordinary practice and accept as facts without comment.

One case of excessive counterbalancing is stated to have caused "the wheel to rise so far from the track in its upward gyration as to crush the wheel guard and running board." This seems impossible in a properly constructed engine, as the wheel guards and running boards are always high enough to clear the wheels and save them from being torn off in the event of a spring or hanger breaking, and allowing the frame to come down and rest upon the top of the box; in this position the flange of the tire would be nearest the wheel guards and running board, except slight differences of height resulting from worn crown brasses. As locomotives are built to provide against such contingencies, and clearance is allowed for wear and maximum movement of driving box—both of which are liable to occur in actual practice—it is not altogether clear how, by the worst possible counterbalancing, such an accident could have occurred.

The method of counterbalancing most in use is as follows: Ascertain the separate weights of the large end of the main rod, the parallel rod, the crank pins and the crank-pin brass. These added together, taking the proper amounts borne by each wheel constitute the revolving weights. For the reciprocating weights, take the combined weights of the piston and rod complete, the crosshead and the small or front end of the main rod. This divided by the number of driving wheels on each side, added to the revolving weights, is the amount of balance required opposite to, and at the same distance from the centre as the crank pin. Owing to the large amount of weight required, it is impossible to so locate its centre of gravity, and the equivalent is usually placed out next to the rim in proportion to its distance from the centre of the wheel.

Another method is to take only two-thirds of the reciprocating weight and divide it among the driving wheels. Each method has its advocates, and some of the fastest trains in this country are, to the writer's personal knowledge, hauled by engines counterbalanced according to these rules, which run smoothly and steadily without injury to the track.

Some locomotives having 33,000 lbs. on each pair of driving wheels, hauling express trains on 60 and 67-lb. rails, were counterbalanced considerably in excess of the first rule—that is, more than the total reciprocating weight, was divided among the driving wheels. No bad effects to the track were observed from the use of the engines, although the time made by them was often very fast. It may be added that this was not intended as an experiment in the interest of science, but was the result of an error in the calculations. The jumping or vertical motion of an engine running over a bridge is very noticeable, especially if the bridge is long, and the speed fast.

This is often cited as an illustration of over-balancing, but to what extent this can be eliminated and still retain steadiness of motion when on solid track is still a matter of some doubt.

At the present time, having no actual facts to present of express locomotives running with driving wheels counterbalanced only for the revolving weights, the writer is unable to state to what extent it would improve or impair the steadiness of the engine when running at high speeds, but is inclined to believe that some counterbalance must be added to counteract the inertia of the reciprocating parts. C.

Old Trains on New Time Tables.—A Question on Rule 20.

Norfolk & Western Railroad,
RADFORD, Va., May 14, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

This road changed its time table at 12.01 p. m., May 12, and considerable discussion arose over a point on which I would be very glad to get your opinion through the columns of the *Railroad Gazette*. The point at issue is this: train No. 4 eastbound on time table No. 3 leaves the western terminus of division No. 1 at 7.30 a. m. and arrives at the eastern terminus of the division at 11.05 a. m., 55 minutes before the new time table goes into effect. The train is then taken up by the connecting division, No. 2, of the same road and runs for 30 miles, when it strikes the new table, at 12.01 p. m., which it takes up, there being a difference of 1 hour and 30 minutes (later) on time table No. 4. Train No. 4 on schedule No. 4 strikes 12.01 p. m. about 7 miles west of eastern terminus of division No. 1. Now, is it necessary, in order to fulfill schedule No. 4, to run a train No. 4 from a point where it strikes 12 01 p. m. on division No. 1 to the point where train No. 4 took up time table No. 4? This would necessitate running two number fours over about 40 miles of road, or annulling the schedule.

Here is another case: Train No. 16 on time table No. 3 leaves the western terminus of division No. 1 at 10:45 a. m., runs 35 miles and strikes the new time table (No. 4), lies there two hours and fifteen minutes; then takes up time table No. 4 Train No. 16 on time table No. 4 leaves the western terminus at 1:30 p. m. Is it necessary to run two number sixteens to fulfill the schedule from the western terminus to the point at which train No. 16, of time table No. 3, took up time table No. 4? One party maintains that two trains No. 4 and two trains No. 16 are necessary from the points mentioned above to carry out the time tables. Another party argues that time table No. 4 is but a continuation of time table No. 3, and that trains 4 and 16 run until they overtake time table No. 4, and then take it up; but he does not believe in the retroactive principle.

DARBY.

[Assuming that the Standard Code is in use, it is plain from Rule 20 that two trains are required for each schedule, as claimed by the first-mentioned disputant. The other party can make this clear to his mind by imagining himself in charge of an extra train at the western end of division No. 1 at 1:29 p. m., and desiring to proceed eastward. According to the time table he must wait for train No. 16. He has no right to assume that 16 has gone (ahead of time); neither can he consult the old time table, for it is as dead as it will be a hundred years hence. He must ask for orders; the dispatcher will then be compelled to annul the schedule for No. 16.—EDITOR RAILROAD GAZETTE.]

Pooling and Consolidation.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The recent unanimous vote of the Central Traffic Association on the dressed beef rate and the reported intention of that Association to abolish all differential rates, has brought up the old question of the justice of differentials The latest utterance is that of a general manager, who is reported in a Western paper as denouncing differential rates as blackmail. On the other hand, Mr. Fink, before the Senate Committee, said they were just. Probably each railroad officer looks at the question according to the position of his road as strong or weak.

For the past two years we have heard continuously that the Inter-state law was a great mistake, because its tendency was in favor of the strong roads and toward the absorption of the weak. The general manager just quoted said: "The doctrine of the survival of the fittest must apply." Leaving out of view the obvious fact that railroads and animals have some points of difference, let me take a look ahead, when, as it may be supposed, the powerful system will control the other and the Erie lose its independence, we will say. If the Vanderbilt system controls it, why, of course there will be peace between them, just as there is peace now between the New York Central and the West Shore. The lion and the lamb of Scripture will lie down together because the lamb will be inside the lion. Do we understand Mr. Depew and others rightly, that they have said that such consolidation (of railroads, not animals) would be a great calamity and its possibility a strong argument against the Inter-state law? But now comes up the important question: If the differental plan for saving the weak roads is wrong, and if the present tendency towards combinations of roads is dangerous, how can we follow Mr. Depew in advocating a legalized pool, which shall have the same effect?

It has always seemed to me that we who are in favor of pooling were logically estopped by that fact from denouncing the Inter-state act because of its supposed tendency towards amalgamation. JUDEX.

[Pooling means administrative union on certain lines of business. Consolidation means financial union and financial centralization. The former is, under certain circumstances, a necessity. The latter is sometimes under the same circumstances an evil, or at any rate it is perfectly conceivable that it should be. If Mr. Depew says, as he does in substance, that the Inter-state law does harm in preventing the railroads from obtaining the good effects of administrative union without laying themselves open to the possible abuses of financial consolidation, he makes a perfectly intelligible and self-consistent statement. Even those who disagree with this view of the matter can hardly claim that Mr. Depew or any one else is "logically estopped" from holding it.—EDITOR RAILROAD GAZETTE.]

English Train Accidents.

We print below condensed accounts of some of the accidents which are given special mention in the British Board of Trade Report for the year ending Dec. 31 last, which is summarized in another column. The reader will understand that *opinions* shown in these accounts are those of the Inspectors.

The first accident on which a special report was made was a derailment on the Glasgow & Southwestern, near Holywood, on Sept. 28. A night express train was derailed while running at about 60 miles an hour round a curve of one mile radius on a slightly descending grade. The three rear vehicles jumped the track at a point where it had been thrown out of line by the engines of the same train; they ran about half a mile on the sleepers, finally stopping on a bridge whose strong transverse floor beams supported the cars in safety. The track, which was of double-headed rails, weighing 80 lbs. to the yard, was found after the accident to have been pushed out of line for a distance of several hundred feet, the distortion varying from nothing to as much as 32 in., and alternating, first to the right and then to the left. There were two engines at the front of the train, each engine and tender weighing 71¼ tons. Major-Gen. Hutchinson concludes that the weight of the engines first distorted the line and that the oscillation thus induced caused buffer locking between a Pullman car 59 ft. long and the vehicles before and behind it. These buffers were found after the accident to have been locked, and it is assumed that the bad curving of the cars thus induced increased the distortion of the track. The Inspector says the track was strong and well ballasted; no fastening had given way before a wheel left the rails, and the super-elevation (calculated for a speed of 60 miles an hour) of 2½ in. was uniform; and he concludes that the lesson of the accident is, that it is not prudent to run at high speed with two heavy engines at the front of a train. In this case the leading engine was entirely unnecessary, having been attached to the train simply because it happened to be going light at that time. The Inspector thinks the stopping of the train was unsatisfactory, the distance consumed having been about 2,700 ft. The brake was the automatic vacuum. The train was fitted throughout, but nothing is said concerning the number of wheels braked.

On the same road, Nov. 15, at Kilmarnock, a train coming into the station at midnight struck a pilot engine standing on the main track waiting to assist the train up a grade. The standing engine was 20 ft. outside a home signal at which the train should have stopped, but the latter was approaching too rapidly, and the blame is clearly upon the runner of that train. He had no power brake, but this should only have made him more careful. The engineer of the standing engine is excused for not clearing the home signal, because, according to custom, he had to stand back far enough to clear a cross-over track. The station had no adequate distant signal, but the company promises to erect a new cabin and rearrange things.

On the Great Eastern, at Colchester, Oct. 1, the sixth vehicle in a passenger train was derailed, just after leaving the station, by striking a trailing point frog, of which the wing rail was about ⅛ in. higher than the V-point. The frog was formed of separate pieces; and the wing rail on the outside of the main track had been renewed a few minutes before the passage of the train, the section master having done the work in a hurry and neglected to take proper measurements. The Westinghouse automatic brake materially mitigated the consequences of the accident.

On the same road at Bow Road, Oct. 26, a freight train held by a home signal was run into by a following passenger train about 8 p. m. The block system was in use and it was a clear case of forgetfulness on the part of the signalman. It appears that the block instruments stand normally at "line clear." The signalman claims to have been thrown off his guard by having to book trains in place of his boy helper, who had, according to custom, gone outside to wash the windows; at any rate, on the approach of the passenger train, he saw the needle showing "line clear," and supposing that he had omitted to notice the receipt of that signal after the passage of the freight from the next station in advance, admitted the passenger train to the section. He then made a fictitious entry of the time when he assumed that he ought to have received the "line clear" signal. The signal man had had 28 years' experience. The runner of the passenger train is held responsible for not being able to stop short of any obstruction between the distant and home signals, the rules of the road requiring this. The runner was of 24 years' experience and had been on duty 11¼ hours. If the needle instrument had been of the kind which normally stands at "line blocked," the signalman's error would probably not have been made. Moreover, at a busy cabin, the booking lad should not be taken from his duty to clean windows.

On the same road at Liverpool street, Dec. 1, a passenger train entering the station was derailed at a facing point switch. The locomotive was a tank engine with four driving wheels under the centre and leading and trailing wheels with radial axle boxes. The axles were perfectly straight, but the load on the right and left wheels were found quite unequal. The evidence as to the cause of the derailment was conflicting, several eye-witnesses testifying that the engine left the rails and was subsequently re-railed at a three-throw switch, while the men on the engine declared that it had not been off. The engine was running coal bunk in front. The inequality of the load and the sharpness of the curve (330 ft. radius), together with the comparative lightness of the load on the front wheels, are believed to have been the cause of the derailment. The engine pushed the rails out of line and that derailed the cars. Maj. Gen. Hutchinson says the curve

STEAM INSPECTION CAR FOR THE NICARAGUA RAILROAD.

Built by the BALDWIN LOCOMOTIVE WORKS, *Philadelphia, Pa.*

should be made easier or the speed limited to 5 miles an hour. He also says, that if engines of this pattern are to be run backward, means should be adopted for throwing additional weight on the trailing wheels, as their load varies from 6 tons to 10, according as the supply of coal and water is small or large.

On the Great Western Railway, in London, Oct. 24, at 7:13 p. m., an empty engine, standing in front of a tower, was given a verbal signal to proceed to the next station when it was on the wrong track. The runner immediately discovered the error, but collided with the passenger train before he had time to stop the engine. The signal man had ordered the light engine forward so as to get it off from a locking bar upon which it stood. By this operation the engine was placed beyond the control of any signal. Col. Rich attributes the collision, which, though serious, caused no injury to passengers, to "human fallibility;" yet the runner of the light engine should not have run past a signal not lowered for him, and the signal man should have insisted on his going back. The runner of the light engine had been on duty since 4:45 a. m., though he had had several hours' rest meanwhile.

At Windsor, on the Great Western, a midnight passenger train ran into a head-house station so rapidly as to crash through the brick walls of the station building. No persons were in the way however, and no one was injured. It appears that the vacuum brake was used at this station only in case of emergency, and this time it failed owing to the engineer's lever handle having slipped back on the spindle. Two nuts which should have held the lever had become partially unscrewed. "The locomotive Superintendent of the road proposes to take effectual means for preventing the nuts becoming unscrewed in the future."

At Bewdley, on the Great Western, 8:31 p. m., Oct. 10, a freight and a passenger train were approaching a station on parallel tracks which ran into one. The home signal was against the passenger train, and the passenger runner came to a stop; but, as his train was customarily given the precedence over the freight, he immediately started along, and only stopped and backed up when the signalman held out a red light. He was too late, however, and the freight struck him. He had been on duty since 6:30 a. m., though he had had four hours' rest Colonel Rich thinks it impracticable for any man to remain on duty such long hours without becoming overweary, and consequently careless and bewildered.

At Gaer Junction, Newport, on the Great Western, a crossing collision resulted from an engineer running past a distant and home signal, and some 250 ft. beyond the latter. He was running at slow speed up a 50 ft. grade, and excuses his misconduct by saying that he mistook the signals and that he was bothered by the breaking of his gauge-glass; his fireman corroborates this story about the gauge-glass, but Col. Rich doubts it, and regards the excuse as worthless. Nobody saw any steam about the footplate, and the incident was not mentioned to the guard when he was spoken to immediately after the collision.

At Barton station, Hereford, on the Great Western, Dec. 8, a large cast-iron cog-wheel loaded on a freight train knocked down an over-head bridge. Col. Rich finds that the rules of the Clearing House and the instructions to agents about loading such freight are not stringent enough. No such bulky shipment should be sent over a foreign line except after a special communication from the General Freight Agent of one road to the same officer of the other.

At Winwick Junction, on the London & Northwestern, Sept. 17, a fish-van was found to have lost one pair of wheels (which were picked up some half mile back); they had evidently been running off the rails nearly 3 miles. The axle was broken and this is believed to have been the cause of the accident. Nine hundred chairs, 400 fish-plate bolts, 2,000 keys, and various guard rails and other fixtures were broken. The axle was made of Bessemer steel, at Crewe, in 1877. Diameter at centre, 4¼ in.; at wheel seat, 4¾ in.; at shoulder of journal, 4⅛ in.; at journal, 3¼ in.; no record of mileage. The axle was found hard and brittle, and Maj. Marindin can account for the breakage only on the supposition that the metal had deteriorated and become brittle after running about 10 years.

Steam Inspection Car.

The handsome inspection car shown in the engraving was built by the Baldwin Locomotive Works for the Nicaragua Railroad. It is propelled by a single pair of drivers which are driven by a pair of small locomotive cylinders to which steam is furnished by a vertical boiler mounted in one end of the car. The car is intended to be run with the inspectors' compartment ahead. The engineer either looks through the glass partition ahead or out of the side windows, as the case may require. The car is furnished with a headlight at the front and rear. It is also supplied with with front and rear pilots of iron. With a single pair of drivers at the centre of the car and two trucks, one at each end—the one at the engine end is equalized to the drivers—this car presents a symmetrical and workmanlike appearance, and undoubtedly rides comfortably.

The following are some of the leading features and dimensions:

Gauge, 3 ft. 6 in.
Fuel, wood.
Cylinders, 7 × 12.
Driving wheels, 40 in. diam.
Total wheel base, 12 ft. 8 in.
Rigid wheel-base (distance between centres of driving-wheels and truck-wheels at engine end), 6 ft. 4 in.
Truck under passenger end fitted with swinging bolster and radius bar.
Diameter of steel-tired truck wheels, 28 in.
Tank capacity, 200 gallons.
Weight in working order, 26,000 lbs.
Weight on driving-wheels, 16,000 lbs.
Equipped with Eames vacuum driver-brake.
Fire-box, copper.
Tubes, seamless drawn copper.
Feed water, supplied by two monitor injectors.
Nathan sight-feed lubricators for cylinders.
Car-body, outside, mahogany; finished natural color.
Passenger compartment 7 ft. wide by 8 ft. 3 in. long, finished in light-colored wood, fitted with one sofa across the car and five rattan arm-chairs.
Floor covered with parquetry.
Head-board lining quartered oak veneer.
Partition between engine and passenger compartment a single sheet of heavy plate glass, with sliding curtain.

The Future of Electric Traction.

In the early days of steam locomotion, George Stephenson was a staunch upholder of the steam locomotive as against the fixed engine and hauling rope, and though in his day the locomotive had not attained such a position as it now holds, it is clear that Stephenson was right in his views. In his day, however, there were many inclines which were beyond the power of the locomotive to surmount, and these were worked by fixed engines and ropes. Notable amongst these was the celebrated Oldham incline of the Lancashire & Yorkshire Railway.

The rate of slope was 1 in 23, and rope traction was in use until one day the rope gave way, and the train ran back, it is said, as far as Manchester, a distance of five or six miles. After this accident the fixed engine was abandoned, and locomotives did even the severe work of this steep gradient.

Without the self-contained independent steam locomotive an extended railroad system would not have been possible. Rope traction is suited for small work in exceptional positions, and as such has been successful in San Francisco up the steep hillside terraces; in New Zealand up the steep gradients of Dunedin, and up Highgate hill, London, all of which are exceptionally steep hills.

In electric traction there are, broadly speaking, two possible systems. The first is the conductor system, wherein an electric conductor conveys to an electric motor on the car a current from a generating station worked by a fixed engine. This is not unlike the rope system, for the train is not independent. It draws its energy from a fixed point, and has no life in itself. The second system is the storage battery or accumulator system. In this system certain secondary batteries are charged from a fixed engine and dynamo, and thereafter give out power to a motor carried by the car. The batteries are enormously heavy compared with the power they will store up and give out as work, and hence are not in a position to compete with a steam locomotive in general railroad work. With them, however, a locomotive is entirely independent and self-contained, and the storage battery system seems very fairly suited for small river steamers or pleasure boats.

Considering the youthfulness of electrical science as it now stands, there is every reason to believe that the mechanical difficulties of insulation may be very largely removed in the near future, and the handling of dynamos and motors be made equally as safe as the management of a steam locomotive. At present there is an evident tendency among a few electrical engineers toward fitting every axle of a train with a motor; they have not in their ideas got beyond the application of electricity to tramways and toy railroads, and the idea of separate motors is discarded as incidental merely to steam power, and not necessary but for the boiler. It is argued that by affixing a motor to many wheels of a train the vehicles will be self-propelling, and the loss due to separate engines avoided. The care necessary for such a multitude of armatures, magnets and brushes as this system would involve seems to us rather an obstacle to the successful practical application of this multiple system, and electric motors of large size and weight are more convenient and economical, as in case of steam engines, it is far easier to keep in order one large piece of mechanism than a number of small ones. Granting then the possibility of picking up current from a conductor, the present state of knowledge of electricity seems to point to the future of electric traction as being brought to a successful issue by means of electricity of high E. M. F. carried by small conductors.

One of the main difficulties appears to be in working direct without the intervention of gearing between the revolving armature and the driving axle. Three hundred revolutions per minute is a high speed for a locomotive, but only moderate for an armature. Invention would appear therefore to be properly directed to securing a slow speed motor of great power—a difficult problem, especially in a locomotive in which the wheels would be small of necessity to allow of a high rate of revolution for a given speed. If it should occur then that electric traction take the place of steam on a railroad now existent, it would appear, so far as can now be foreseen, that the tract of country served should be divided into sections, and each section should contain a generating station; that each generating station should contain a large steam engine of a power sufficient to drive the average load on its section with economy and to drive the maximum load without undue waste. Junctions of branch lines would be the proper positions for such central stations, the work of which should be arranged to include so many miles of main line and also a proper share of branch line and local traffic in order that every station might serve to supply a considerable number of trains.

These remarks are made with a view to drawing attention to the present state of the science and pointing out that if suc

cess is to be finally attained, it will probably be only through a determined vigorous effort to overcome the difficulties incidental to the use of high tension currents. We must confess, too, that the problem of applying electric traction to main line trains sinks into insignificance as compared with its application to station yard or shunting purposes, at crossings, etc. The storage of energy by secondary batteries is so far entirely out of the range of the practical for railroad work. At present there is no prospect that a powerful storage battery which will stand the shocks and vibration of travel can be invented. Were such a battery possible, that is, one sufficient to develop say 600 horse-power for fully two hours and weighing with the motor itself no more than a present locomotive and tender, the question would be solved, for it would be a very simple matter to run a motor alongside the battery shed, remove and replace its tank of batteries by a crane and so put it in order for a further two hours' run. With such a system the present number of locomotives might be somewhat reduced. For town service, short tramways and similar lines electric traction is already a success. The difficulties in the way of heavy and trunk line service are not yet attempted in a really serious spirit.

Palmer's Audible Block Signal.

The illustrations given herewith show the principles of construction of an automatic electro-maguetic signal, recently patented by Mr. H. J. Palmer, of 532 Walnut street, Philadelphia. The plan and operation of the signal may be described as follows:

In fig. 1, *B*, *C*, *D*, *E* represent short sections of track at the ends of block sections of any desired length—one mile, more or less. Each section, as shown in the cut, is equipped with two pairs of rails placed longitudinally on the sleepers between the rails of the track. The first pair, beginning at the left, marked $a\ a^1$, are distant from the second pair $b\ b^1$ a few yards. These rail sections are insulated from the ground and from each other, and form terminals of electric circuits, which are clearly shown in the diagram.

Fig. 2 represents the apparatus located upon the locomotive, in which *U* and *V* are metallic brushes, pivoted in a frame *W* attached to the bottom of the foot-plate of the locomotive. These brushes, with the wires attached to them, form an electrical connection between the engine and the detached rail sections as the train passes over them. *Z* represents the battery, carried upon the engine, and this is the only battery in the whole system. *K*, *L*, *N*, *O*, *Q*, *M*, *R*, *P*, are electro-magnets, whose use will be explained further on. The operation of the device is as follows: An engine, moving from right to left, entering the block at *B* finds the armature *k* in the position shown in the cut, which indicates that the previous train has passed out of the section of road between *B* and *D*. This being the case, the circuit from battery *Z*, on the engine, flows to *U*, thence through the rail section to armature *k*, through k^1, back to the rail, and thence to brush *V* and through coils of relay *o* back to the battery. In passing through relay *o* it attracts armature o^1 and opens the circuit through o^1 and o^2, and thus prevents the armature of relay *p* from being attracted. The circuit actuating the alarm bell *q* in the cab is thus left open and no signal is given. On reaching rails $b\ b^1$ the circuit from the battery on the engine pursues a similar course as before and actuates relay *L*, which attracts the armature *k*, this armature being now held against the front stop k^1 by gravity alone. Now, if a following train enters the section the current from the battery on its engine finds no path through the rail sections $a\ a^1$ because the circuit has been broken at k^1; consequently relay *o* remains open, and the circuit from the battery through o^2, o^1 and *X* closes relay *p*, and sets the alarm bell ringing. The armature of relay *p* has no retractile spring and the circuit actuating the alarm bell *q* therefore remains closed and keeps the bell ringing until the engineer pulls off the armature and opens the circuit by hand.

The metallic brushes *U V* are held by non-conducting posts *u v*. On the top of the post *u* is an insulating point, as shown in the cut, upon which the spring *Y* rests when the brush post is in a vertical position. The posts assume this position when free, being held there by springs. When the brushes come into contact with the conducting rails the posts are tilted and thus complete the circuit which runs through o^2 by bringing *Y* into metallic connection with *X*. By means of this tilting arrangement the circuit through o^2 is broken by relay *o* before it is closed at *X*, thus insuring that no danger signal shall be given. In other words, the tilting of the post *u*, which occurs every time a pair of the special rails is traversed, always closes the circuit at *X;* and this always rings the bell, giving a danger signal, unless the circuit which runs through *X* has previously been broken at o^2. This circuit can be thus broken only by the closing of relay *o*, and this can occur only when the circuit is completed through *U*, *a*, *k*, k^1 and *V*.

The first train, on passing out of a section, in closing the circuit through the "danger relay," as at *O*, *M*, or *P*, at the same time energizes the "safety relay," as *K*, *N*, or *R*, one or two sections back. Thus, in the figure, when *M* is closed, setting a danger signal for section *D*, *K* is simultaneously closed, setting the signal for section *B* at safety. The connections for each signal being thus made to extend back the length of two sections there is always one danger signal at least the length of a whole section behind each train, so that the system provides a perfect set of distant signals. The circuit may, of course, be extended over only one section, if desired, thus constituting a set of home signals; signals which trains must always approach under control.

Any two conducting rails forming a pair, as, for instance, $g\ g^1$, may be connected to the bolt of a draw-bridge or of a facing-point switch, so as to give a warning when the bridge

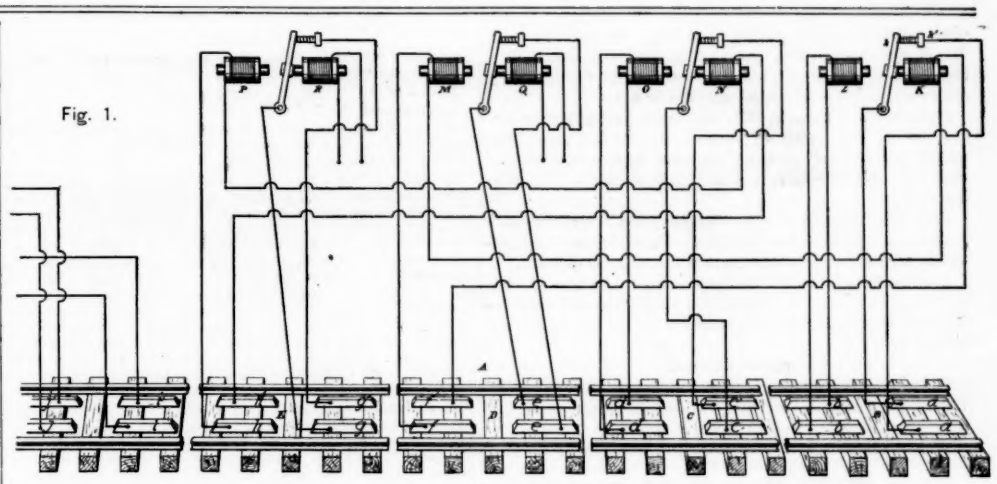


Fig. 1.

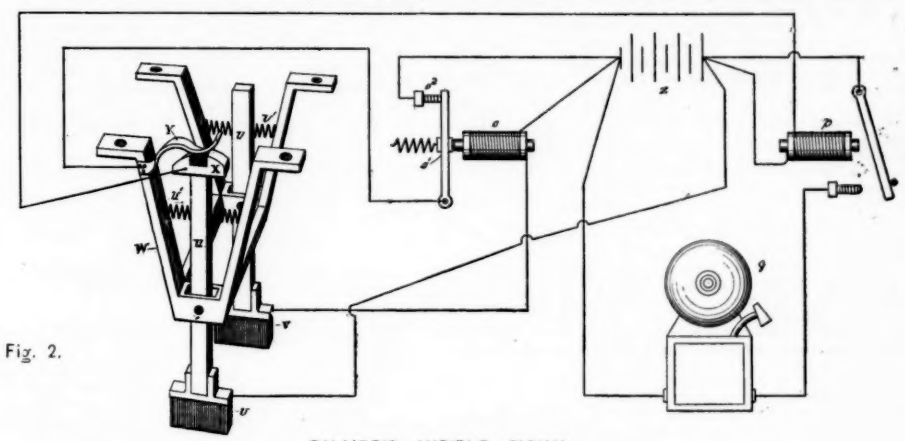


Fig. 2.

PALMER'S AUDIBLE SIGNAL.

or switch is not in the safety position. In place of the bell *q* a whistle can be used. Circuit closers, provided with a local battery, may be arranged alongside the track or on the lines of other roads near grade crossings, so that any train or engine, whether equipped with brushes or not, will energize the magnets *L*, *O*, *M*, etc., and thus set the danger signal.

The points of advantage claimed for this signal are that, being audible, it commands attention, even from careless or forgetful engineers, and the warning sound continues until it is stopped by a positive act of the runner. It employs the principle of the automatic brakes, in that the danger signal is the result not of force, but absence of force. It can be used independently or in connection with other systems. It requires no long lines of pipe, no track levers or complicated machinery, and the cost of construction and of attendance is reduce to the minimum. The armature *k* could readily be equipped with a light disk signal, which could be so placed within the view of the engineer as to make it possible for him to see as he entered a section that his engine had actually set the instrument in the danger position for the protection of his own train. The inventor of this signal has had experience in the operation of other signals involving similar principles, and has devised the various parts of this with a special view to overcoming the faults of the others.

Erie Meeting American Society of Mechanical Engineers.

MAY 14, 15 AND 16.

All day Tuesday members were arriving in the city. The delegation from New York and the east generally, reached Erie about 8 o'clock in the morning, and opened headquarters at the Reed House. Members spent the day according to individual choice, as no programme was arranged for till evening, when at 8 o'clock the convention held its first session in the rooms of the Board of Trade.

Mayor Clark made an address welcoming the society to the city. President Towne replied briefly, thanking the mayor and the committee for their kindly reception and speaking briefly of the position of the mechanical engineer.

Ex-President Horace See then delivered an address, and this was followed by a social reunion, a bountiful supper being served by some of the young ladies of Erie.

The second session took place on Wednesday morning, President Towne calling the meeting to order at 10:15 o'clock. Reports from the council and tellers were received and some committees appointed, after which the reading of professional papers was in order. Before presenting the regular papers announced for the session, however, opportunity was given for discussion of the address delivered by Mr. See on Tuesday evening.

Mr. See had said in part:

The supply of skilled workmen—the rank and file of our industrial army from which many of the illustrious men in our profession have sprung—is insufficient to meet the demand which our manufacturing interests, from their rapid and marvelous growth and diversified character have created. In this emergency the wealth and prosperity of our country is shown by the numerous schemes launched on the ocean of experiment for the education of the young to fill any position from the workman to the manager. By some it is proposed to teach specific trades in the school instead of in the workshop, not only as an offset to the dropping off of apprenticeship in some branches, but particularly on account of supposed superiority of the school over the workshop as a place wherein to inculcate the necessary knowledge. It is suggested that the mechanic arts high school may be brought into our existing system of public education, and made to serve the needs of a large class of youth who have special capacities for industrial work because manual training has been proved by private experiment to be an indispensable part of education to a large part of our American youth.

It is not only perplexing to conceive how a trade can be taught in the manner specified, but how a boy, staggering under his load of science, technology, industrial art, or commercial activity can be brought down to such an humble pursuit and made to work at it. The fact is that he cannot be brought there, but aspires at once to something higher. His efforts in this direction, as a rule, are unsuccessful, and cause him to drop out of mechanical pursuits.

Mechanical science is defined as enabling its possessor to plan a structure or machine for a given purpose without the necessity of copying some existent example; to compute the theoretical limit of the strength and stability of a structure, or the efficiency of a machine of a particular kind; and to judge how far an existing practical rule is founded on reason, how far on custom, and how far on error. The workers in the trades are not usually looked upon as coming within the definition of those requiring mechanical science in order to be fully equipped for their field of usefulness If they, however, are to be included within its meaning, it would not do to leave out the thousands of others with the same pretensions existing in our large cities. To attempt a thorough education of such a throng in schools, either through private generosity or at public expense, is altogether impracticable.

If it is important that the engineer should receive instruction from the practitioner to enable him successfully to design and execute work, is it not equally important that the machinist should acquire his skill from contact with the best mechanics, by practice in, and by familiarity with the customs, usages, character and variety of work of the workshop?

If a better education is to be given to this class, the night school must supply it in connection with the workshop in the one direction; or, if the philanthropist desires to lend his assistance to support as well as to educate, the money would go farther, and the product, it seems to me, would be a much superior one, if the manual and practical education were left to the workshop in the other.

In carrying out this last scheme, the boy, who has previously received a good common-school education, should be regularly apprenticed, for at least four years, in an establishment engaged in the special work he expects to follow at the end of the term. Instead, however, of devoting the entire time, as at present, to shop work, but four consecutive days of the week would be spent in this way, and the remaining two in study. In order that a full complement shall be provided for the different establishments throughout the week, the boys for each establishment should be divided into two bodies, so as to spend their time alternately there. By this means thirty-two months would be spent in the shop and sixteen in the school, together with the superior advantage not only of sandwiching the mental labor between plenty of physical exercise, but of frequently having brought before the pupil the practical application of the rules taught in the school, besides his having the almost continual exercise of his hands, and his finding out how to do the varied work. The industrial home, with its schools, should be located in the midst of a manufacturing centre. The school should be well provided with all the necessary facilities for instruction in subjects bearing upon mechanical engineering, naval and civil architecture, chemistry, electricity, mathematics and drawing. For boys who are able to live at home, night-schools could be provided in the same institution, taught by another corps of teachers.

Mr. MCFARREN spoke at some length in criticism of the ex-President's position toward manual schools, stating that he did not think the members would want Mr. See's address to go to the press as the opinion of the Society on so important a question. He contended that Mr. See confused the ideas of trade schools and manual training, and held that the latter was in no way to be condemned because a school

could not turn out a practical mechanic. Manual training, Mr. McFarren said, does not seek such results, but it does help boys to self support, and benefits them whether they afterward follow mechanical pursuits or not.

Prof. DENTON thought Mr. McFarren was unjust to Mr. See, and misinterpreted his position. Prof. Denton held that schools would never give us engineers who would surpass those of to day who have reached eminent places from shop teaching.

Prof. DE VOLSON WOOD concluded the discussion with remarks to the effect that schools were useful when they provided instruction for which there was a popular demand.

The regular papers of the session were then begun. The first was by Thos. S. Crane, on "The Piping of Steel Ingots," and was read in abstract by the secretary. It was not discussed.

GAIN SHARING.

The second paper was on "Gain Sharing," by Henry R. Towne, who explained at considerable length the system in force at the shops of Yale & Towne. He said:

Where contract system of work prevails, I have adopted the rule of paying the contractor, like his helpers, by the hour; his "basis rate," or rate per hour, being determined by adding together the three following factors, viz.: (1) his value as a workman, usually that of his best helpers; (2) one-half cent. per hour for each completed year of service as contractor, in recognition of increased value due to experience; and (3) a figure representing a very small but definite percentage on the aggregate amount of his contract earnings, in recognition of the fact that his responsibility varies somewhat with the volume of work under his control. The first of these items is usually constant; the second causes a slight annual increase in the "basis rate;" while the third tends to increase the rate when the volume of business is large, and to reduce it when business falls off. The percentage of the profit fund or "gain" allotted to a contractor may be larger, proportionately, than to a salaried foreman, depending upon his duties, his liability for quality of product, and the amount of his "basis rate" or hourly wages.

Appended are several papers illustrative of the working of the system in actual practice. The first of these —Appendix A—gives the results obtained in the case of a number of the contracts to which I have applied the gain-sharing system, two of these covering a period of two years each. All of the others are now running on the second year, but only the results of the first year are here stated. The "contract prices" adopted for these gain-sharing accounts were in some cases the actual previous costs, but in a majority of cases the contract prices were fixed at rates which were a reduction of from 10 to 20 per cent., and in one case of 30 per cent. from previous costs. These reductions were made advisedly, and only in cases where there was good reason to believe that increased effort would result in very considerable reductions in costs. In most cases the results have justified the reductions, and even on the basis of the new prices the contracts have yielded fair profits or dividends.

Appendix B is a transcript of one of the monthly exhibits mentioned above as being posted in the room or shop where the system is in force. These figures were inserted in the blank, month by month during the year, and gave information to the employés of the results of their work as affecting their interests under the gain-sharing contract. In this case the proportion of gain allotted to helpers was 25 per cent., and the net result of the operations for the year yielded a dividend to them of 5.7 per cent. on their wages or earnings during the year.

Appendix C shows the rules governing the application of the gain-sharing system to the iron foundry in the works of the Yale & Towne Manufacturing Co., at Stamford, Conn. Where the system is applied to a shop or department in which contract work obtains, the rules require modification in certain details, but are substantially the same in principle as those given herewith. In all cases the rules will require careful adaptation to the details of the particular work to which they relate, and to the methods of shop management and organization which are in use.

APPENDIX A.

Contract No.	Term.	Helpers' earnings.	Gain or loss.	Helpers' share.	Rate of dividend
	Years.				Per cent.
1	5	$13,080.43	$3,388.53	$850.18	.065
2	5	9,216.87	*37.59	.....	.....
3	5	3,666.34	840.05	208.98	.057
4	3	4,936.54	573.58	148.09	.03
5	5	910.22	*48.52	.....	.....
7	3	3,861.28	537.72	134.43	.035
8	3	1,012.92	447.59	111.42	.11
9	3	419.55	109.04	27.27	.065
10	5	17,696.47	1,256.37	318.53	.018
15	5	728.53	358.20	89.62	.123
SECOND YEAR.					
1	.....	$14,096.05	$3,251.04	$817.56	.058
3	.....	3,732.21	1,027.20	261.15	.07

*Losses.

APPENDIX B.

Monthly Accounts Relating to Contract Number 3—1887.

MONTHS.	Total profit for month.	Profits from beginning of year. Total amount.	25 % belonging to helpers.	Percentage on wages.	Monthly charges for tools.	Monthly charges for supplies.
January	* $45.52	.....	.....	.....	$55.84	$3.95
February	85.72	$40.20	$10.05	.017	46.85	2.97
March	115.53	155.73	38.93	.039	78.13	7.62
April	98.48	254.21	63.55	.046	35.57	5.98
May	* 51.46	202.75	50.69	.0307	37.16	1.75
June	182.90	385.65	96.41	.0505	26.66	2.04
July	9.12	394.77	98.69	.046	17.25	2.74
August	76.12	470.89	117.72	.049	27.10	2.02
September	8.64	479.53	119.88	.044	44.20	3.14
October	114.76	594.29	148.57	.0499	56.96	6.27
November	* 94.72	499.57	124.89	.0378	58.30	.75
December	340.48	840.05	210.01	.057	27.30	4.56
Totals for year.	$840.05	$840.05	$210.01	.057	$511.32	$43.79

* Losses.

APPENDIX C.

THE YALE & TOWNE MFG. CO., STAMFORD, CONN. RULES FOR "GAIN-SHARING" SYSTEM IN IRON FOUNDRY, DECEMBER, 1887.

1. *Contract Period.*—The present contract between the company and the employés of the foundry will cover a period from Dec. 1, 1887, to Dec. 1, 1888, and will be subject to revision after the latter date.

2. *The System.*—The "gain-sharing" system has been in operation during 1887 throughout the greater part of Dept. A., where some 200 men are now at work under it. Its essential principle is this: that out of each $100 of savings or "gain" in the cost of product, in labor or supplies, the company retains only $50, the other $50 being divided among the employés in the department. To accomplish this the company agrees to organize the method of operation, to keep the necessary accounts, and in general to facilitate matters so far as it reasonably can; the employés, on the other hand, agree to use their best efforts to increase the efficiency of their work, to economize in the use of supplies and material, and in general to do their share towards reducing the cost of finished products.

3. *Contract Prices.*—To establish a basis by which to measure the saving or gain effected, the following plan has been adopted. The average prices for metal and fuel which prevailed during the past six months have been carefully ascertained, and these prices have been adopted for the contract period; applying these prices to the product of the foundry for the past six months, all other items of labor and supplies being extended at their actual amounts, the cost per pound of castings of each class during the past six months has been ascertained; the prices ascertained are adopted as the *basis prices* for the contract period.

4. *Contract Profit or Gain.*—At the close of each month of the contract period the cost of castings produced during the month will be ascertained by charging up the metal and fuel at the *fixed prices* adopted as above, and charging all other items, including wages and supplies, at actual cost. If the cost of castings thus ascertained is less than the *basis cost* determined as above, the difference between the two will be the saving or gain for the month. The results of each month's operations will be posted in the foundry for the information of the employés.

5. *Division of Profits.*—Within 30 days after the close of the contract year the total amount of saving or gain will be divided as follows:

Fifty per cent. will be retained by the company.

Ten per cent. will be allotted to the foreman of the foundry.

Forty per cent. will be distributed among the employés of the foundry in the proportion of the actual wages earned by each during the contract year.

6. *Wages Rates.*—The wages of each employé will be fixed, as heretofore, by the foreman of the foundry, who will continue to have full discretion in the employment and discharge of the help required, and in the direction of their work.

7. *Payment of Profits.*—Each employé will be entitled to his pro rata share of the profits, whether he has worked during the whole year or only a portion thereof. * * * Any profits due to employés, and not claimed within three months after the close of any yearly contract period, will thereby become forfeited; all sums thus forfeited will be paid over by the company to the Yale & Towne Mutual Benefit Society. * * *

10. *Guaranty.*—The company guarantees the payment to the employés of the foundry of the regular wages earned by each, on day work or piece work, irrespective of whether this contract shows a profit or not.

11. *Conditions.*—The effect of the system being to give every workman employed under this contract a participation in the profits resulting from it, it is hereby stipulated, as a condition of the employment of each and every person engaged under this system, that, in consideration of the interest assigned him in the profits of the contract, all claim thereto shall be forfeited by him in the event of his discharge by reason of misconduct or incompetency, or in the event of his combining with others in any way to disturb or affect the relations between the company and its employés. This provision in no way curtails the right of each employé to negotiate with the company, through the foreman, in regard to his own rate of wages, nor does it in any way impair the title of each employé to his proportionate share of the profits in the event of his honorably leaving the company's service, whether at its desire or his own.

Mr. TOWNE, in answering some questions, recommended Dr. Gilman's book on the subject (Profit Sharing Between Employer and Employé), and called attention to the fact that the one imperative cause for seeking an improvement on the ordinary wage system lay in self-interest, and that some sharing system could be made effective, because it results in arousing self-interest on the part of the employé also.

Prof. WOOD inquired if the system explained in the paper could be applied to largely diversified manufactures.

Mr. TOWNE replied that the Yale & Towne Co. applied it to twenty-one different lines of work.

Prof. WEBB inquired if Mr. Towne's system resulted in the workmen watching one another closely, and deprecating waste on the part of their associates, and even trying to displace unthrifty men.

Mr. NASON reported successful use by him of a plan of distributing a percentage of profits every year among his employés, his shops being run on piece-work.

Mr. TOWNE, in closing the discussion and answering inquiries, said that such a system of sharing as his paper explained presented little difficulty in operating it after the plan was once decided on and the system adjusted to the particular business. The extra cost of book-keeping was trifling; half the time of an ordinary clerk would cover the additional labor at the Yale & Towne Manufacturing Co. He said the system was used there in the foundry in many classes of work. That its effect, as suggested, was to make the men anxious for better work from all hands, and to increase generally the *morale* of the shop force.

The third paper was on the

COMPARATIVE COST OF STEAM AND WATER,

by Chas. H. Manning. Mr. MANNING referred to current ideas as to the great cheapness of water power as compared with steam power, and characterized such opinions as a popular fallacy. He considered steam to be generally cheaper, and in all caseswhere much steam can be used for heating or drying purposes. He showed that the main object in developing the great water power plants in the Eastern States was to attract manufacturing works and build up busy towns, so enhancing real estate values; and that water power was therefore, often offered at very low figures in proportion to cost of preparation and maintenance. He referred, also, to the objection to water power on the score of unreliability, giving as an example the effect of a freshet last fall, causing delays, which in some lines of business would be very costly.

Prof. DENTON spoke of the variable character of estimates on the cost of water power as compared with steam. He showed that in certain cases water was clearly preferable to steam, citing an instance of a spot where a good head of water was available but where coal could not be brought without great difficulty. He asked whether Mr. Manning's figures for cost covered expenses which must, in due time, be necessary in repairing the large dams. Also, if 1¾ pounds of coal allowed per horse power in compound engine was sufficient. He thought 2 pounds would be more correct.

The fourth paper was a descriptive one,

THE OLD LOCOMOTIVE, 'SAMPSON,'

by D. W. Robb. At the Albion coal mines in Pictou County, Nova Scotia, may be found a curious collection of old machinery, mostly lying rusty and disused, which, to the engineer of to-day, recalls the times of Watt and Stephenson, and the early days of the steam engine. While making a recent visit to this place the writer was shown many mechanical curiosities, notably three old locomotives, built by Timothy Hackworth, in the shops of the Stockton & Darlington Railway, in England, in the year 1838. One of the locomotives referred to, the "Sampson," was in use as late as the year 1882, is in a fairly good state of preservation, and, as it is a good example of the first English locomotives, a brief description may not be uninteresting. As previously stated, it was built at the repair shops of the Stockton & Darlington Railway, at New Sheldon, Durham County, England and was brought out with two similar locomotives in 1839, to run on a railway, built for the Albion mines, to convey coal from its pits at Stellarton, to Pictou Harbor, a distance of six miles.

The "Sampson" has three pairs of driving wheels, coupled in the usual manner, and not differing very much in appearance from the driving wheels of the modern "mogul" locomotives. These wheels consist of a cast iron centre and an outer rim, also of cast iron, twelve wooden plugs being driven between the centre and rim to hold the rim in place. The tires are of iron or steel, shrunk on in the usual manner. The axles, which are 5⅝ in. in diameter, run in ordinary journal boxes, bolted to brackets made of boiler plate, which are riveted to the shell of the boiler. The boiler is a plain cylindrical shell, 54 in. in diameter and about 13 ft. long, containing a single return flue, 20 in. in diameter; one end, being fitted with grates, was used as a furnace. The products of combustion following the flue to the front end of the boiler, were then returned direct to the smoke-stack, which is at the rear end of the locomotive. The cylinders and driving gear are at the front end of the locomotive, and the driver's place was at the front, so that he could keep a good lookout ahead. The fireman was stationed at the rear.

The cylinders (15¾ in. × 18 in.) are vertical, resting on cast-iron box like frames, forming part of a bonnet or hood which partially incloses the valve gear, pumps, throttle and reversing levers and other working parts. The cross heads, instead of being guided by slides in the ordinary way, have an arrangement of levers and sliding block. That this device caused very little friction is shown by the fact that the original pins and brass bushes in the levers and sliding block are still in place, and show very little wear after forty years of almost constant use. The valve gear consists of four eccentrics, attached to the axle to which the cylinders are connected; the eccentric rods extending up into the hood on the front end of the boiler, have forked ends which engage the pins of a rock arm, which is connected with the slide valves; these eccentric rods are controlled by the reversing lever, respectively engaging or disengaging them for the forward or backward motion. The feed pumps, two in number, are connected with the eccentric rods, and were thus brought within the hood in full view of the driver: in fact, this arrangement of cylinders and valve motion gave the driver a convenient oversight of all the working parts of the engine while in motion, and without leaving his place; but, strange to say, he was compelled to go outside to ascertain the height of water or pressure of steam, the water gauges and steam gauge being located on the side of the boiler. The steam gauge consists of a spring scale attached to the lever of the safety valve. The pressure of steam did not exceed 40 lbs., the spring scale being graduated to 50. The exhaust steam, after leaving the cylinder, was conveyed within the shell of the boiler to the smoke-stack. Thus reheating the exhaust steam is difficult to understand. Probably the idea was that the heat of the exhaust could be utilized within the boiler, the designer overlooking or not clearly understanding the higher temperature of the live steam within the boiler.

The sand box of the "Sampson" consisted of two buckets of sand, one at each end of the locomotive, the sand being thrown by hand on the rails. This duty was attended to by the driver when moving ahead, and by the fireman when moving backward.

Some committee announcements were made, and then the "Topical Discussions" were taken up for a few minutes. The first two topics were discussed together:

72. What form of self oiling boxes have you found the best for lime and countershafting? Can you give figures as to economy of oil as compared with other methods?

73. What form of oil-cup or lubricator do you find most economical for use on machines requiring constant lubrication?

Discussion was opened by a communication from James Christie, recommending grease in preference to oil, on account of economy and cleanliness. This was followed by remarks from about a dozen members, including Messrs. Denton, Hemenway, Scheffler, Sprague, Hardwicke, Cooper, Parker, Davis and Nason. Their testimony was, on the whole, decidedly in favor of grease as the best lubricant. Prof. Denton was alone in citing adverse examples, where grease could not be used instead of oil; and others gave instances equally favorable to grease as against oil.

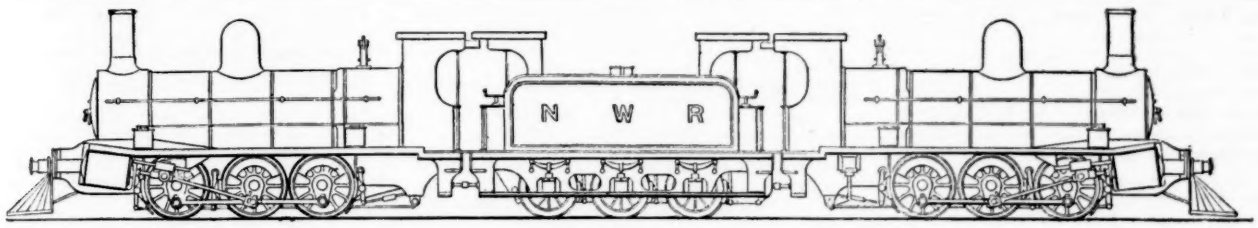
Toward one o'clock the session adjourned.

After dinner, the members were driven, in a body, to the Erie City Iron Works, which, together with the Stearns Manufacturing Co.'s establishment, was to be the object of inspection for the afternoon.

The third session was held on Wednesday evening at 8 o'clock, the first paper being on

STANDARDS,

by James W. See, of Hamilton, Ohio. The author gives an extended discussion of the necessity of standards in gener al



LOCOMOTIVE FOR THE INDIAN STATE RAILWAYS.

and presents many illustrations of the evils of a careless method of designing structures and machines. In addition to this is an interesting and entertaining list of commercial articles which are fit subjects for standard dimensions. Following this is given a list of units for which it is most desirable to adopt standards, together with a review of the variety of standard units for each subject in different localities. A Government Bureau of Standards is recommended.

A communication was read from Oberlin Smith agreeing heartily with the recommendations of the paper, and enlarging the list of subjects which needed standardizing. Mr. Smith objected, however, to the proposal to allow any one to establish a standard, and suggested that there should be a commission empowered by Congress to decide on the official recognition of standards submitted.

Mr. MASON said that Mr. See had omitted reference to the standard for steam fittings, known as the "Briggs gauge," which had recently been recommended and adopted by the society. The fact that a standard size for bricks had been lately settled upon in Philadelphia was referred to.

In closing consideration of the paper, it was resolved that the chair appoint a committee to arrange for taking action in the line suggested by Mr. See, to report at the next meeting.

The next paper—slightly changing the pre-arranged programme—was on "An Error in the Encyclopædia Britannica," by Prof. J. Burkitt Webb. The error is in relation to the reaction of a jet issuing from a vessel.

The Professor explained his view of the mathematical mechanics involved, and stated that if the deductions of the writers in the Encyclopedia were true, having experimented upon the jet in a sufficient number of places, we could deduce therefrom the absolute motion of the earth in space, which is an absurdity in itself; at least we can form no definite conception of such a motion, nor of any fixed point in space to reckon such a motion from.

Secretary Hutton read a letter from Mr. Unwin, of London, the author of the criticised article, which tried to show that there was no such error in the Encyclopædia as Prof. Webb's paper stated. At any rate that is what seemed to most of the members to be the object of Mr. Unwin's communication; but Prof. Webb immediately proceeded to show that it claimed nothing of the sort, but really admitted the truth of his criticism. This caused some little amusement, and after Prof. Wood made some suggestions, which Prof. Webb pronounced irrelevant, no champion for the Encyclopædia appeared, and the discussion closed.

The next paper was also by Prof. Webb, called a

NOTE ON THE STEAM TURBINE.

The point of this paper was illustrated by blackboard work, and Prof. Webb described a steam turbine which he studied on the "City of Berlin." This machine used steam with as great economy as an ordinary engine, by having the steam act on a succession of rotary blades, its pressure diminishing but a small percentage between adjacent ones, and the speed of rotation necessary so that the blade should move at the same speed as the steam—the essential principle of economy—being therefore easily attainable.

Mr. SWAZEY spoke of a steam turbine, in the construction of which he assisted, which was made on somewhat the same principle, and which ran at the astonishing speed of 25,000 revolutions per minute, the largest rotating part being 6 in. in diameter.

Prof. DENTON spoke of the advantages and disadvantages of the turbine as a steam motor. He thought that the friction in the turbines described would be considerable, and that there would be opportunities for leakage between the blades and the casing.

Prof. WEBB answered this, in closing, by saying that the space for leakage was very small, and without so many blades to pass in succession the steam was apt to get "tired," and go very slow.

The fourth paper was entitled Notes on the Comparative Loss by Friction in a Transmitting Dynamometer under Different Loads and Speeds, by Samuel Webber, of Charlestown, N. H.

Professor DENTON considered that the experiments described in the paper did not in any way confirm the experiments of Mr. Woodbury on the same subject. He stated that for his part he did not consider that any of these experiments disproved Morin's laws of friction. He admitted the care and accuracy of the Thurston and Woodbury experiments, but thought the results as to the constant value for the friction could be entirely explained by the large proportion of friction-causing factors which were the same in every test.

The fifth paper was by Prof. Denton and D. S. Jacobus on Steam Consumption by Engines at Various Speeds. This paper was accompanied by many diagrams and tables and is too elaborate to be adequately treated in an abstract.

The last paper of the evening was on the Performance of a Thirty-five Ton Ice Machine, by Prof. Denton. This is a careful description of a machine in use at the pork-packing establishment of Sperry & Barnes, New Haven, Conn. It is used to keep 400,000 cu. ft. of space at an average temperature of about 34 deg. F. A full discussion of the performance of the machine is given and tables of results. The paper is a very valuable one for those interested in the problems of cooling freight preparatory to shipment.

Reading of papers was resumed at 10 o'clock Thursday morning.

The first four papers were by Professor De Volson Wood. The first was on the "Expansion of Timber due to Absorption of Water." This paper will be printed in full in the *Railroad Gazette*.

Mr. BALL followed, giving an instance in his pattern shop where there occurred an apparent difference in longitudinal shrinking of two kinds of pine, amounting to over a sixteenth of an inch.

The other papers by Prof. Wood were on Some Properties of Ammonia, Formulas for Saturated and Superheated Vapors and Some Properties of Vapors and Vapor Engines. The subjects were treated mathematically, and the papers were discussed by Prof. Denton.

The next paper was by Mr. A. F. Nagle, of Chicago, on Cornish or Double-beat Pump Valves. It was read by the Secretary and was not discussed. This paper contains an interesting discussion on large valves in general, and information which may be of assistance in making locomotive throttle valve designs.

A paper by Prof. A. W. Jacobi, of Newark, on an Improved Motion Device for Engine Indicators, was next presented. It received no discussion of importance.

A paper on the

DISTRIBUTION OF STEAM IN THE STRONG LOCOMOTIVE,

by Mr. F. W. Dean, followed. It was a supplement to a paper presented at a previous meeting.

A few indicator cards taken from locomotive No. 444 on the Lehigh Valley Railroad since the valves were changed from steel to cast-iron are given in the paper, together with a steam consumption for horse-power per hour *calculated from the indicator card*. It is difficult to say that anything is proved by these cards except it be that the Strong valve gear can be made to reduce the ratio of compression at high speed, which is a valuable feature in any gear for locomotives. The steam line on the cards shown is not good, and the back pressure is higher than is obtained by other gears. The inferiority of the steam line may be due to two conditions, wire drawing of the valve, or wire drawing at the throttle. If at the throttle, it is impossible to see the use of calling attention to them, because it would have been an easy matter to have opened the throttle and taken cards far more creditable to the locomotive and more in keeping with what all believe to be her possible performance. If the wire-drawing is the result of an inferior valve opening then it is time it was changed, because of all locomotives extant the Strong designs have the most flexibility in the matter of steam regulation. Much back pressure on a card from a Strong locomotive is unnecessary; the locomotives have large grates and heating surfaces and do not need a powerful blast. While the Strong locomotives are doing heavy work with great and very commendable economy, yet there is shown on the cards exhibited in the paper read, an amount of horse power used in blowing the fires and other work than hauling the train greatly in excess of what it should be. It would have been a more satisfactory paper if attention had been called to these facts.

The eighth and last paper of the session was by Prof. Jay M. Whitham on Cylinder Ratios in Tripie Expansion Engines. This paper gives the present practice in regard to the ratios of the several cylinder capacities of the several cylinders of multiple expansion engines, and the two common methods of estimating the proper ratios of capacity.

Prof. SPANGLER spoke of the original methods of proportioning compound engine cylinders, and showed that an adaptation of them to triple expansion engines seemed to give Prof. Whitham's results and with much less trouble. He considered the "annular ring method" proposed to be faulty, and not new, but an amplification of an old rule for compound engines.

Some of the topical discussions were then taken up. Topic No. 72 (What form of self-oiling boxes have you found the best for line and countershafting? Can you give figures as to economy of oil as compared with other methods?) was reconsidered for a few minutes, Mr. Ezra Fawcett describing a self-oiling box with reservoir below the bearing, taking one-third pint of oil every six months. Ordinary cups were said, by Prof. Denton, to answer for cylinder lubrication for pressures of 160 or 170 pounds.

Mr. DORNE stated that the steamship "Ohio" was running without any cylinder oil.

Topic 75 ("Is it right or wrong in theory to put a central support under the bed of engines of the Corliss type? Do you know of any bad results from its use or from its absence?") provoked some diverse expressions of opinion and regret that Professor Sweet was not present to explain his position in the matter.

Mr. SCOTT A. SMITH said that from his personal acquaintance with Mr. Corliss for a dozen years he was in a position to state that Mr. Corliss did not consider that there was any advantage in omitting a middle support, and that, later on, he really built engines with a middle leg where higher speeds and greater initial pressures were employed.

Mr. DUTTON reviewed the change in the conditions under which engines are run, and showed that a corresponding change in the form of bed would not really be necessary.

Mr. TOWNE thought that any fault with the middle support would be on account of the foundation.

Topic 76. "Does it prevent nuts from working loose, or prevent breakage of bolts, to reduce their cross-section between the head and the nut?"

A communication from Prof. Sweet was read, stating that the advantage of reducing the bolt section was well known, and seemed to be due to giving the bolt uniform strength throughout. A hole in the shank gives the same result.

Prof. DENTON explained the principle to be that the thinner metal gets time to stretch and so helps the weak thread. Several members reported their practice of reducing the section of bolts and other similar pieces.

Topic 78. "Have you tried the plan of applying electro-motors to mechanical operations requiring not more than ten horse-powers? Can you compare their convenience and economy with those of small engines, or the usual transmissions by belting and shafting?"

A letter from James Christie described a case of a movable drill for girder work, where an electric motor was desirable because of the difficulty of getting other power to it. In general he considered electric motors inadvisable.

Other members referred to the almost prohibitory first cost of electric motors.

Mr. MCFARREN showed that there might be economy in them for small power, since small steam engines were often wastefully run, and in a large central station the steam would be economically generated and used to run the dynamos.

Thursday afternoon was spent in visiting the Ball engine works, the Watson paper mill, the T. M. Nagle and the Cleveland & Hardwick machine shops and the Jarecki Mfg. Co.'s foundry.

Thursday evening was the occasion of a reception at the Reed House, with dancing and a supper.

Friday morning was devoted to the last reading of papers.

The papers read were "Belt Traction on Pulley Faces," by Scott A. Smith; Longitudinal Riveted Joints of Boiler Hulls, by John H. Cooper; Kerosene Oil in Steam Boilers, and Bits of Engine Room Experience, by Lewis F. Lyne. We hope to give abstracts of those papers in a later issue.

Some business was then transacted, and resolutions of thanks were adopted recognizing the indebtedness of the society to the local members, to the citizen manufacturers, to the Erie Board of Trade and, lastly, to the resident ladies who contributed so materially to the society's enjoyment.

The next meeting was announced to be held in New York in November.

Friday afternoon was the time of departure for nearly all of the visiting members. A sail on Presque Isle Bay was enjoyed at one o'clock, with an opportunity to witness a drill by the corps of the Life Saving Station.

These social entertainments were not the least attractive of the programme, and the members dispersed with a common feeling that Erie was a capital place in which to hold an engineers' meeting.

Locomotive for the Indian State Railways.

The double locomotive illustrated herewith is a design for use on mountain grades on the Indian State railways. These locomotives were constructed by Messrs. Neilson & Co., of Glasgow. The following is a general description of the engine:

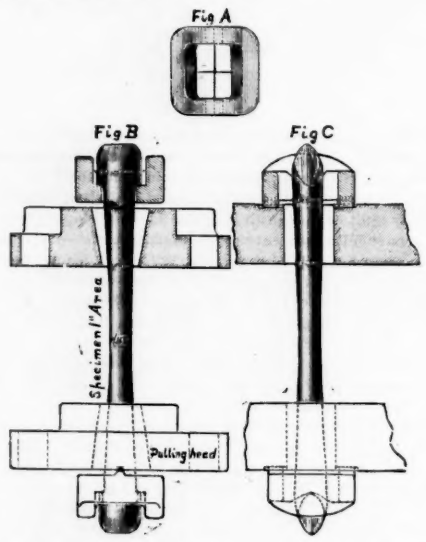
Diameter of cylinders	19 in.
Stroke of "	26 in.
Diameter of driving wheels	50 in.
Wheel base, driving	9 ft. 6 in.
" " total double engine	57 ft. 6 in.
Heating surface, each engine:	
Tubes	1,278.5 sq. ft.
Fire-box	104.0 "
Total for one single engine	1,382.5 "
Area of fire grate	22 "
Number of tubes	194
Diameter of tubes	2 in.
Diameter of boiler at front end	52 in.
Weight in running order:	
Leading axle	26,432 lbs.
Middle "	35,616 "
Rear "	35,503 "
Total drivers	97,552 "
Tender	91,616 "
Weight empty:	
Leading axle	26,880 lbs.
Middle "	30,352 "
Rear "	29,680 "
Total drivers	86,912 "
Tender	42,560 "

These locomotives are to work on grades of 1 in 100, 1 in 80, 1 in 70 and 1 in 45. There are long stretches of the line where the grades are 1 in 45, or 117 ft. per mile.

Some comment on designs of this character will be found in the editorial columns.

Self-adjustable Holder for Cast-iron Tensile Test Pieces.

We illustrate herewith a self-adjustable ho'der for cast-iron tensile test pieces made by Riehlé Bros. At *A* is shown a top view of the holder and of the specimen. At *B* and *C* are shown side views of the holder and the position and shape of the cast-iron specimen.



The specimen, as here shown one-eighth full size, is round and reduced at the centre or breaking point to 1.113, or one in. area. Either end is formed with projecting lugs. These lugs rest on adjustable rocking bearings, both above and below, and receive all the strain that is brought to bear upon the specimen; by this method the specimen naturally aligns itself and the strain applied is received through its central axis and it is not possible for it to be subjected to any twisting or side strain.

Many companies operating blast furnaces are providing themselves with patterns for making test specimens, and as often as new ores or new mixtures are used having test specimens cast.

The Rules of Interchange.

At the meeting of the Western Railway Club, held May 21, the Committee on Revision of the Interchange Rules made the following report:

In the opinion of your Committee, the Interchange Rules should be altered only slightly, if at all. As they now read, they embody the ideas brought forward at many conferences of men who have made an especial study of the requirements of interchange traffic.

As a whole, the rules provide very well for the requirements, and constant annual alteration in their form is apt to result in more harm than good. While holding to this belief that, generally speaking, it is much better to let well enough alone, your Committee nevertheless finds that, as some changes will undoubtedly be made at the coming Convention, it will be proper for the Western Railway Club to give its ideas as to what changes should be made.

The fact that the M. C. B. Arbitration Committee has asked several clubs to offer suggestions as to changes, makes it especially desirable that our Club should outline the alterations which it considers are the most desirable.

Your Committee has carefully gone over the present Rules discussing each of them from the standpoint of several members of the Committee, and also in the light of suggestions recently made in the club meetings and finds that changes are needed in but comparatively few cases. Alterations are recommended in Rule 3, Clause f, Clause o, paragraph 5 and 8 and Clause s; Rule 6, Rule 9, Rule 12, Rule 14, Rule 16, Rule 17, Rule 23 and 24.

These recommended alterations are as follows:

Rule 3.

Clause f.—Add "rims broken as indicated by dotted lines are defective and should not be accepted." This refers to fig. 5, page 7, of rules. If the rims are broken off on a line drawn vertically from the point where the chipping is shown to commence, then the wheel should not be accepted.

Clause o.—Paragraph 5. Your Committee is in doubt whether springs with one inside coil broken should be accepted, and asks the club to discuss the point.

Clause o.—Paragraph 8. Change to read as follows: "dead blocks, wood unsound, castings cracked through bolt holes, or broken, or improperly secured in place."

Clause s.—Insert the word "not" after the word "cars." Your Committee also suggest that further restrictions as to conditions of doors might be of value.

Rule 6.

Omit all after the word "done," referring to limitation of age of voucher.

Rule 9.

Add at the end the following clause: "Wheels with flanges or treads chipped or broken for six inches in one continuous piece resulting from seams or blow holes shall be considered as broken or worn out under fair usage."

Rule 12.

Change the first three lines to read as follows: "Cars unfit for further service will be reported to the owner of the car. If the owner elects to have the car forwarded home it shall be regularly way-billed at the expense of the owner. Such cars shall have a home card attached on each side of the body of the car. The cards shall be," etc.

Rule 14.

Add at the end of the Rule: "No bill shall be honored for wheel and axle work if not presented within 6 months after work is done."

Rule 16.

Add to the parenthetical clause in line 6 the following words: "Otherwise the owner of the car must be communicated with."

Rule 17.

Add to second line, after word "circumference" the words "and weight."

Rule 23.

Add to the price list as follows:

Brakes.

Air brake.....
Foundation gear for two trucks ... .
Foundation gear for one truck.....

Also add to paragraph referring to depreciation (page 20) the words "no depreciation allowed for brakes."

Rule 24.

Insert in third line after word "trucks" the words "and brakes."

C. A. SCHROYER,
G. W. RHODES,
W. D. CROSMAN,
B. K. VERBRYCK, } Committee.

President RHODES: I would suggest that we confine ourselves in discussion first, to the Committee's recommendations, and then if any member thinks of other matters which the Committee has not covered we can take them up. We will take up Rule 3, clause f. The Committee's recommendation is that we add, "Rims broken as indicated by dotted lines are defective and should not be accepted."

Mr. TOWNSEND: Is it not pretty clearly a broken wheel where it is broken on the edge of the tread? I suppose of course it would depend somewhat on the length of the chip.

The PRESIDENT: Secti n f does not specify what the length should be. I was under the impression that a chipped rim covered both the slight chipping at the edge, and also if it went through the rim, but some of the other members of the Committee were not of that opinion. The argument was brought up that if it was only chipped the wheel did not necessarily leave the rail; but if it was broken off it came down between the rails.

Mr. SMITH: I would like to know if there is any member here who has ever seen a wheel chipped on the rim without finding on that same wheel blow holes running around the tread?

Mr. TOWNSEND: I have frequently seen them, caused I suppose by passing over a frog where the rail was worn; the point of the frog was worn so that it let it down on the rail and chipped it out, while the wheel was perfectly strong.

Mr. VERBRYCK: I have seen lots of them chipped that way too. Two or three years ago we had a great many on our passenger cars, on our Council Bluffs line, that would be chipped, and some of them would be cracked, while the wheels were perfectly strong. It was caused I suppose by passing over a defective track. Our Roadmaster went all over the line with a car to detect where it was, and finally he found it was from defective frogs. We removed those wheels. The rim was not broken off in all cases.

The PRESIDENT (addressing Mr. Barr, who had just entered the room): Mr. Barr, I would like to ask your opinion on this question. The point that has come up is this; that as the old rule is defined it looks as if a chipped rim simply applied to a chip broken off at the edge of the wheel, which would not necessarily interfere with the running of the wheel. Now, in some cases it is really a broken rim, not a chipped rim, but a broken rim, where it goes clean through, and the Committee have recommended that when the break goes clean through it be a cause for rejection.

Mr. BARR: I do not think I have ever seen what you would call a chipped rim, that is, a little piece chipped off, as it is often chipped off at the point of the flange; but I have often seen what would be designated as a broken rim, that is, broken down almost straight, sometimes in and sometimes out, and then curved. I think that in nearly all cases, it is due to striking some obstruction on the track. Some wheels are more liable to the defect than others, but there must be some defect or impediment in the track, in my opinion, to produce a broken rim, every time. It has to strike something. A frog or a crossing may do it, and undoubtedly those are the causes of broken rims, and it is no inherent defect in the wheel. At the same time I do not believe that we find half a dozen wheels in a year with a chipped rim without breaking down more or less through the rim. My opinion about the defect is simply this, that if the tread is not made too narrow, the safety of the wheel is not impaired; but at the same time I do not think that if a wheel gets in that condition on any road they have a right to ask another road to take it. It seems to me that the word "chipped" here is indefinite. It doesn't seem to me that it is really necessary to make any distinction in the rules.

The PRESIDENT: Sometimes, Mr. Barr, the rim of the wheel becomes hollow, or honey-combed, and then often the top of the wheel will chip off, and that is what I have considered before as a chipped rim.

Mr. BARR: That is a defective wheel. It was defective when it left the foundry. It seems to me the owner of the car ought to be responsible for it, because the wheel maker certainly is.

The PRESIDENT: I am disposed to think that the recommendation put in by the Committee in this report is a good one. Where these broken rims occur, as Mr. Barr has just explained, it is in many cases on account of a defective track. On our road some years ago we had a number of wheels break, and just on the rim a piece would come out clean through. It would be from 3 to 4 in. long, moon-shaped, and we supposed it was done by defective frogs or a cross-over. Attention was called to it and the Road Department went over the track carefully and nothing wrong could be found. We still had the wheels break, especially on our passenger equipment. We finally had the thing narrowed down so that we knew within some 60 miles where it occurred, and we further knew that it was on the east track; but we couldn't get from the Road Department the defective crossover. At last the Master Mechanic went down himself, and made a business of finding it. We had had from 50 to 60 wheels broken in this same way. It was in the spring time, about the time the snow had gone off, and when he got down to a certain cross-over he found there all the little pieces that were broken off. The cross-over was very defective. There was a clear case where the owner of the car ought not to have suffered for the poor track of the railroad.

Mr. BARR: We had a similar experience on the Pennsylvania road in New Jersey. We had a great many rims broken off in that way, and we finally located it at the crossing of the Pennsylvania and Lehigh roads, under circumstances almost exactly similar to the one you have just recounted; but in making this distinction you still seem to exclude blowed rims, as they are called—hollow rims. I think our proper principle is that a wheel broken in any way is a defective wheel. A wheel that is broken or shows a crack is a defective wheel, and any one should be allowed to remove it. It makes very little difference where the break is. If it is in the flange it indicates that the flange has had an extraordinary blow to knock a piece out, even if it is small; if it is in the rim it indicates the same thing; if it is in the wheel it indicates that it is weak, and, even though it may not be dangerous, there are a great many of those things that have a tendency to enlarge. Our rule is that any defect of that kind renders the wheel liable to removal.

The PRESIDENT: Still the question is when to charge the owner and when to charge the railroad.

Mr. BARR: I think that the addition recommended by the Committee means that they are chargeable to the railroad from which the car was received.

The PRESIDENT: That is really the case here, "wheels chipped on the rim, leaving tread less than 3¾ in.," etc. They are chargeable to the road from which the car was last received.

Mr. BARR: Yes, and then why should the addition be made to clause f?

The PRESIDENT: The reason of the addition is that the Committee were under the impression that that form of defect had been classed as a chipped rim when it extended through the tread, and was accepted even though it did not make the tread less than 3¾ in. Now, the Committee did not want to accept it even though it left the tread less than 3¾ in.; they wanted to consider that as a cause for rejection.

Mr. LEWIS: Mr. President, if I understand it the Committee propose to reject the wheel, even though the break extends an inch and a half in depth. Now, at the time this rule was adopted it was considered that 3¾ in. was the limit. The modification proposed by the Committee calls for the rejection of a wheel that is chipped in any way outside of the limit of 3¾ in. if broken clear through, even though the chip is only an eighth of an inch in depth. I do not think that that is necessary, because the Committee has decided that 3¾ is the limit of safety, and anything outside of that is safe, even though it is broken clear through. I move that clause f be accepted as it now reads. Seconded.

Mr. HICKEY: We have had wheels running on our roads for several years with tread less than 3¾, and I have seen a good many foreign cars having treads slightly less than 3¾, which were just as safe as though they had a 5-in. tread. It seems to me that in dealing with this subject we ought not to get the limit below 3¾, and if you say in clause f "wheels chipped *or broken*," the motion would be agreeable to me. I offer that as an amendment.

Mr. LEWIS: I accept the amendment.

Mr. Lewis' motion as amended was then put to vote and carried.

The PRESIDENT: The next recommendation of the committee refers to clause (o), paragraph 5, "Your Committee is in doubt whether springs with one inside coil broken should be accepted, and asks the club to discuss this point." This section of this paragraph is one that was inserted at last year's annual meeting. Is it the practice on the roads to accept double coiled springs with one spring broken?

Mr. VERBRYCK: I do not think it is. I had a while ago some controversy with the Northern Pacific on that same question. One of their cars was repaired on our road and the spring was left in. The inside coil was broken, and they billed us for a new spring.

Mr. BARR: As I understand the matter it is simply this; that if a car comes to an inspector with one inside coil broken he may accept it or he may reject it, but in either case he would require a card for it, and the road on which the spring was damaged would be the road that would have to repair it. This clause is not fixing the pay for the defect, but it is simply a direction to the inspector, saying that a car may be inspected when in that condition, but it does not relieve the road from responsibility for breaking the spring. I presume the question that the Committee brings up here is, Is it safe for a road to accept a car with one of the inside coils broken?

Mr. LEWIS: I think that that does not impair the safety of the car, and that if Mr. Barr's interpretation is right it simply makes them attach a bad order card and that the car should be accepted with one coil broken, as it does not affect the safety of the car at all.

The PRESIDENT.—As I understand the explanation of the gentlemen it is this: That rule 3 reads that cars may be refused for any of certain defects. Now, then, while drawbars and attachments for instance are in bad order there may be some cases in which they cannot be accepted on a bad order card, and these sections are the cases in which they may be accepted, not shirking the responsibility, but simply that they may be run that way with a bad order card. As I understand it these definitions were brought about by endeavors to keep freight cars moving, with slight defects, and that the definitions became necessary for the assistance of the inspectors.

Mr. BARR: As I understood the discussion at Alexandria Bay last year, these are simply to take the place of correspondence. Your inspector here in Chicago receives a car with one of the coils broken; he looks it over and thinks it is in good enough shape to let it go, and the question is: Ought he to accept it at all with that broken coil? If, on the other hand, the breakage of the coil puts the car in such a condition that it is not safe to go, he certainly is justified in refusing. It is simply a little explanation; that is really all that clause is.

Mr. PECK: If we understand it that way I move that the rule be accepted as it is. Seconded and carried.

The PRESIDENT: The next recommendation of the Committee refers to clause (o), paragraph 8. They recommend to change to read as follows: "Dead blocks, wood unsound. Castings cracked through bolt holes, or broken, or improperly secured in place." The main reason for changing that is on account of the construction of the original clause. It does not read quite right.

Mr. HICKEY moved that the clause as recommended by the Committee be accepted. Seconded.

Mr. BARR: I do not think there is any question as to what is meant by these different paragraphs, and I would move to amend Mr. Hickey's motion in this way: That it is the sense of the meeting that the whole of section o should be rewritten so as to express its meaning definitely and accurately. Seconded.

The amendment was accepted by Mr. Hickey, and on being put to vote was carried.

The PRESIDENT: That covers also, I suppose, the committee's recommendation regarding clause (s), which is to insert the word "not" after the word "cars." The member of the Committee who brought up the next suggestion, "that further restrictions as to condition of doors might be of value," is not present, and I cannot argue the question freely in his absence. If there is nothing to be said on that subject we will pass on to the consideration of Rule 6. The Committee recommends to omit all after the word "done" referring to limitation of age of voucher. The Committee were pretty unanimous in recommending to do away with that clause. It has entailed hardship in a good many cases.

Mr. VERBRYCK: I was opposed to that rule at the time it was adopted, and I am now of opinion that it ought to be taken out entirely.

The PRESIDENT: For myself I would draw the line at two years.

Mr. BARR: If a car has some defect, and it can run all right for six months, it seems to me that the card might as well be torn off and thrown away. I don't think that any defect on a car that can run for six months ought to be charged for.

Mr. LEWIS: I do not quite agree with Mr. Barr in that. There are a number of defects that a car may have, and the car run six months, and still those defects be of sufficient importance to require a card. I think there should be no limit, and would move that the recommendation of the Committee be accepted as the sense of the club. Seconded.

Mr. WILLIAM FORSYTHE moved an amendment that the limitation be made twelve months. Seconded.

The PRESIDENT: Mr. Potter, what has been your expe-

rience on the Fort Wayne road? I understand you have had some difficulty.

Mr. POTTER: We have had the matter up, and we look at it in the light that if a car was offered to us with a defect card, with the time almost expired, it would be very hard for an inspector to judge; he could not refuse the car for the reason that the other man was not responsible for the repairs. I do not see that making it twelve months is going to help the matter very much. Mr. Barr makes the statement that he thinks a defect that has run for six months should be considered as no defect. That is all well enough so far as the defect is concerned, but it won't let the road out who has the car. My opinion is that that part of the rule ought to be abolished.

The amendment was then put to vote and declared lost. The original motion was also lost.

Mr. Barr moved that the clause should be amended so as to read nine months instead of six. Seconded and carried.

RULE 9.

Add at end of rule the following clause: "Wheels with flanges or treads chipped or broken for 6 in. in one continuous piece, resulting from seams or blowholes, shall be considered as broken or worn out, under fair usage."

The PRESIDENT: I would state that the reason for the committee making that recommendation was from some question which came up to distinguish between a chipped flange and a broken flange. The change recommended by the committee covers the question thoroughly. We have been considerably mixed up as to what the defects are, and I think that they can be changed with advantage. Some of the Eastern members of the Western Club have brought up the question pretty strongly as to when a wheel shall be considered to have a chipped or broken flange. The reason is that when it is broken it may be charged to the owner; when it is chipped it may not be charged to the owner.

Mr. SMITH: As I understand that rule, if we adopt it as recommended by the committee, an inspector would be obliged to receive a car if it had a piece chipped out of the inside of the flange 6 in. long. Now I do not consider that a wheel is at all safe to run on a road with pointed switches if there is a piece chipped from the inside of the flange ever so small.

The PRESIDENT: If you will refer to Rule 3, paragraph G, you will see there that wheels chipped on the flange inside, 1½ in. in length or ½ in. in width, or ⅛ in past the centre of the flange, makes a limit under which you are not to receive a wheel, or if the limit is less than that, you will receive it if the flange is chipped. As I understand this matter of the flange breaking, it is liable to be weakened by what I would call an inherent seam, and that when the flange gets a blow, then it breaks off over what was an original seam. Now here is a case of a comparatively new wheel which has had a seam in the flange, and the seam only showed in a small way, and that has resulted in the flange being broken off. Here is a second case: You can see where the old mark is—the old seam—and there is a fresh portion broke. I do not see where there need be so much difference between a broken flange and a chipped flange. There seems to be some difficulty in the minds of some master car-builders as to the difference between them.

Mr. BARR: As all of us have an occasional wheel with a piece scaled off by the point of the flange which has evidently struck something and knocked a little piece off, that is what I understand, and what I presume all of us understand by a chipped flange. If you are satisfied that is an original seam that is broken under fair usage, some one might raise the question and say, here is a wheel broken by a seam, and that the owner of the car is responsible. Now, there would be a point for argument. I do not think you can fix it by a rule at all. Now, if I say, "here is a wheel broken by one of the old seams," some one might say, "no, it is no fault of the wheel; it is done by unfair treatment." We cannot make a rule to cover that unless we should pass a resolution that it is the opinion of the club that these breakages are not due to original defects in the wheel; but it seems to me then we would have to go into the whole question of the make up of the wheel. We would have to write a volume on the subject to cover the ground.

Mr. VERBRYCK: I guess Mr. Barr is right about that; but there has been a great deal of trouble about wheels being broken on the rim with blow-holes. I have had a number of wheels broken where the rim of the wheel was broken off, and it showed a long blow-hole, and I made bills for them and they have said it was a chipped wheel. That is all the reason I would like to have it defined in some way.

Mr. TOWNSEND: I would make a motion that Rule 9 be adopted as now published. Seconded.

Mr. BARR: I think if a number of our members have had difficulty with one part of the rules that something ought to be done. It seems to me that if the wheel that was damaged on the rim had an original hole there that caused that damage almost any reasonable person would be willing to allow a bill of that kind, and if he did not, why, then, force ought to be used by the Arbitration Committee.

Mr. PECK: I would move an amendment that we adopt what the Committee says in Rule 9. Seconded.

The PRESIDENT: Mr. Peck's motion is that the Committee's recommendation for Rule 9 be accepted. It is an amendment to Mr. Townsend's. Mr. Townsend's motion is, that the rule stand as originally framed.

Mr. Peck's amendment that the Committee's recommendation of additions to Rule 9 be adopted was carried.

Rule 12.

The PRESIDENT: In explanation of that I would say that there have been a good many cars carried home for defects which do not seem to warrant it, and that this home order card also is not thoroughly understood.

In the discussion on this rule Mr. Lewis objected to that part of the Committee's report on Rule 12 which imposed the expense of billing a car on its owner. Mr. Verbryck did not agree with him, as it was not always easy to learn the route by which such car came. Mr. A. Forsythe objected to paying mileage on empties unfit for use. Mr. Peck did not understand that to be the case. Mr. Hickey thought disabled cars should be returned like any other empties. Mr. Barr understood that each road hauling an empty charged owner ⅝ of a cent a mile, and the owner made an offset charge of like amount for mileage. Thus the account balanced. President Rhodes said that the idea of the Committee was to prevent home billing of cars unnecessarily, the abuse of the present rule and not the use was aimed at. Mr. Lewis thought companies handling cars in transit and participating in profits should also share the cost of returning it. Mr. A. Forsythe thought where cars were billed home for slight repairs it should be borne by those so billing it. Mr. Schroyer thought the rule recommended by the Committee just. Mr. Barr moved the adoption of the Committee's report on this point. Carried.

On Rule 14 the Committee's report was adopted. The parenthetical clause of Rule 16, amended in the Committee's report, was stricken out by the club. The recommendation concerning Rule 17 was adopted.

Concerning the proposed addition to Rule 23, Mr. Rhodes explained that the Committee in this rule was attempting to provide for the extensive use of air.

The Committee's recommendation as to Rule 24 was also adopted.

The club then adjourned to the third Tuesday of September.

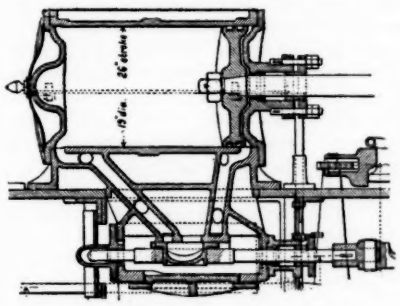
Length of European Railroads, Dec. 31, 1887.

The following table, showing the length of railroads in Great Britain and Ireland and on the Continent, is from official figures published by the French Minister of Public Works. It shows the length of road operated Dec. 31, 1886, and Dec. 31, 1887, the increase for the year and the percentages of increase. In reducing kilometres to miles the co-efficient .0621 has been used, and there are some discrepancies in the result, due to the fact that the co-efficient was not carried out to more places of decimals. They are not, however, important. In the Russian railroads the trans-Caspian line is not included.

	Dec. 31, 1886. Miles.	Dec. 31, 1887. Miles.	Inc. Miles.	Inc. P. c.
German Empire	23,814.7	24,572.9	758.2	3.18
Austria-Hungary	14,531.4	45,343.6	812.2	5.59
Belgium	2,815.6	2,919.9	104.3	3.71
Denmark	1,220.3	1,222.8	2.5	0.20
Spain	5,780.9	5,894.5	113.6	1.97
France	20,706.0	21,259.3	553.3	2.67
Great Britain and Ireland	19,483.9	19,684.5	200.6	1.03
Greece	319.8	375.7	55.9	17.48
Italy	6,941.5	7,213.5	272.0	3.92
Holland and Luxemburg	1,774.8	1,833.2	58.4	3.29
Portugal	949.5	1,135.8	186.3	19.62
Roumania	1,201.1	1,159.9	255.8	21.25
Russia and Finland	17,200.5	17,709.7	509.2	2.96
Servia	297.7	321.0	24.3	16.44
Sweden and Norway	5,489.0	5,557.9	68.9	1.26
Switzerland	1,731.3	1,753.1	21.8	1.26
Turkey, Bulgaria and Roumania	865.7	865.7	....	....
Malta	6.8	6.8	....	....
	125,133.5	129,129.8	3 996.3	3.21

An Uneconomical Cylinder.

The cylinder shown in the illustration herewith is one designed for use on the double locomotive for the Indian State Railways, which is illustrated in another column of this issue. This cylinder represents the most undesirable form for economy. It is designed for use on a slow-moving locomotive on mountainous grades, where the ratio of cut-off must be such as to expand the steam but little, and with this well-understood purpose in view the designer has so arranged the valve seat as to cause the waste room or clearance in the cylinder to be at a maximum, which is in direct contradiction to the simplest and most elementary principles of steam economy. American locomotive builders too frequently err in this respect, but in comparison to this example their worst appears commendable. However, it may be stated, in justice to the Englishman, that a very few isolated locomotives of small capacity have been built with a clearance of about 50 per cent., but in no



case has it happened or been purposed in locomotives of large dimensions, such as the case in point. While there is a question regarding the loss due to clearance in locomotives running in the short cut-offs at high speeds, and while there is also the same question regarding such losses in the case of stationary engines, yet there is not the slightest reasonable doubt about the enormous loss resulting from the use of engines having a large percentage of clearance when such engines are using steam during a large fraction of the stroke and when running slow. An indicator card taken from the cylinder illustrated, which would show a degree of compression approaching the initial pressure would be of most unsatisfactory form. Why it is that this evil exists to such an extent as it does in English and Continental designs is most puzzling and can only be explained by classing the error with those that are so common and so accustomed as to cease to call for comment or attention. Extremes meet in the minds of locomotive designers who one day offer and advocate a most commendable double expansion locomotive to save steam and the next day offer a design whose capacity for uneconomical operation is difficult to equal. In cylinder designs like that illustrated all fine theories regarding the loss due to decrease disappear, and one may resort to a simple arithmetical calculation to determine the unavoidable loss and not subject himself to severe criticism.

TECHNICAL.

Safety Appliances.

The Inter-state Commerce Commission has issued the following circular, to which replies are requested from all interested:

The large number of accidents to employés and passengers occurring on the railroads of this country, and the public belief that a great part of these might be avoided by the use of proper appliances, have led many states to make the mechanical features of railroad working the subject of statutory regulation. It is well known, however, that in respect to some at least of these features, the conditions are such that regulation, if attempted, can neither secure adequate benefit to the public nor be just to the railroads themselves unless it be uniform over the whole country.

In view of this fact and of the request of the Railroad Commissioners of the country, as embodied in a resolution adopted at their recent convention, the Inter-state Commerce Commission desires to call out as full information and discussion as possible upon the question of Federal regulation of safety appliances on railroads. The following matters seem to be of especial importance, but it is not intended to restrict the discussion to them:

1st. The history in each state of safety-appliance legislation. How far such legislation has been enforced. What have been the means used to enforce it. What obstacles have been met with. What the general effect has been.

2d What is the present condition regarding automatic couplers. What prospect there is of a uniform and safe coupler coming into use. What progress the standard coupler, adopted by the Master Car-Builders' Association, is making, and what is the attitude of railroads towards it.

3d. What progress there is in the use of train brakes on freight cars. Whether such progress is satisfactory, viewed as a means of greater safety to train men. To what extent freight trains are run without the necessity of brakemen traversing the tops of cars.

4th. What is being done to introduce safer methods of heating and lighting passenger cars.

5th. What is the state of affairs respecting other safety devices.

6th. Whether legislation looking to Federal regulation of these matters or any of them is desirable, and what the reasons are for and against such regulation.

7th. What such Federal legislation, if any be desirable, should attempt to accomplish in regard to couplers: in regard to train-brakes; in regarding to car heating and lighting; in regard to other matters. What its provisions should be upon each of these points.

8th. If Federal legislation be expedient, what special administrative agencies, if any, should be provided to carry it out. Whether Federal inspection should be attempted, and to what extent and how. Whether a board should be created after the analogy of the Steamboat Inspection Service. If so, how such a board should be constituted in regard to the number and character of its members; what its powers and duties should be; what its connection with other branches of administration.

The Commission believes that justice to railroad employés and to all others concerned requires that this matter receive thorough consideration, and trusts that you will be able to give it immediate and careful attention.

Spur Gears.

The Brown & Sharpe Manufacturing Co. has issued a card circular for the guidance of those ordering spur gears, which contains the following useful rules:

Having the number of teeth and the diametral pitch, to obtain the pitch diameter, divide the number of teeth by the diametral pitch.

Having the number of teeth and the diametral pitch, to obtain the whole diameter or size of blank, add two to the number of teeth, and divide by the diametral pitch.

Having the number of teeth and the diameter of the blank, to obtain the diametral pitch, add two to the number of teeth and divide by the diameter of the blank.

Having the whole diameter of the blank and the diametral pitch, to obtain the number of teeth in the gear, multiply the diameter by the diametral pitch and subtract 2.

To obtain the distance between the centres of two gears, add the number of teeth together, and divide half the sum by the diametral pitch.

Having the pitch diameter and the diametral pitch, to obtain the number of teeth, multiply the pitch diameter by the diametral pitch.

Petroleum Tar for Boilers.

According to the German paper *Dampf*, the tar obtained in the distillation of petroleum serves a good purpose as an interior coating for steam boilers, loosening the scale so that after emptying and cooling them, it either drops off the surfaces of its own accord or may be easily removed by light hammer taps. Scale which has adhered for a long time also gives way to the action of the tar. It is recommended that the boiler surfaces be supplied with one or two coats before filling the boilers.

Collapse of a Locomotive Water Tank.

The *Zeitschrift der Lokomotivführer* records the collapse of a locomotive water tank which is noteworthy in several respects. The tanks were located at both sides of the boiler, measured about 18′ × 2½ × 1½ ft., and held, together, about 123 cu. ft. They were connected by a 4-in. pipe, and the water level was shown by a float and suitable index. The walls of the tanks were stiffened by angle irons and flat braces riveted to the inside. The engine having just come in from a run, was to be housed, and as the tanks were nearly empty a water supply pipe was coupled on, and the right hand tank filled. The right hand injector was still feeding while steam from the boiler, which was at a pressure of about 2 atmospheres, was being blown into the left hand tank. This lasted about 3 minutes, when suddenly this tank collapsed with a loud noise similar to that produced by a hammer blow against an empty tank. The force of the collapse was such as to bend or break all the angles and to bend the braces to one side. The tank plates above and below the angle irons were torn and the top and bottom plates forced outward. One of several plates, about 7 in. wide and 0.7 in. thick, by means of which the tank was bolted to the engine frame, was wholly broken off. The extent of the damage points to the fact that the partial vacuum produced by the inflow of steam to the tank must have been considerable, and can be explained by the circumstance that an appreciable quantity of cold water overflowed from the right hand tank, which had become full, into the one on the left, in which there was only a small quantity of water, not sufficient to condense the steam in it. The covers on the tanks were practically air tight, having become battered down by the constant concussion while on the road, and being furthermore held in place by springs. Entrance of air was, therefore, impossible, there being no special provision for this as in the engines of more recent build.

New Process of Making Copper Castings.

Messrs. Schneider & Co., Creusot, France, have patented a process, which consists in making, in a blast-furnace, a cupola or a reverberatory furnace, castings having a variable proportion of copper, with a proportion, likewise variable, of the ordinary constituents of cast-iron. These copper castings are used for the manufacture of the copper-steels which serve for the preparation of articles such as sheathing and armor for vessels, cannons, projectiles, bed-plates, steam-cylinders, rolls, etc., the articles when desired being case-hardened or hardened in oil. Copper ore is mixed with the charge in the blast furnace, or copper alloys with the charge in the cupola. Also copper filings can be mixed with coal to form a copper-coke, which is used for heating the blast furnace or cupola; or copper compounds can be melted in a reverbatory furnace, with a mixture of steel or iron, under a layer of anthracite to prevent oxidation.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

In another column will be found an illustration of a double locomotive for the Indian State Railways which is a novel departure from the common practice. The design is really a permanent double header; that is, it is intended for use when the conditions are such as to require the use of two locomotives of the ordinary type, continually, in tandem. This arrangement removes the necessity for two tenders and renders easier the transmission of signals from one cab to another. There is nothing in this arrangement to criticise; it is really almost the only plan upon which locomotives of great capacity can be constructed with any approach to a minimum of weight per running foot of track. This general plan is not new in America, however. The well-known Wm. Mason, of the Mason Locomotive Works, of Taunton, Mass., constructed locomotives on this general plan many years since, and recently the South Side Rapid Transit Co., of Chicago, while investigating the possibilities of extending the usefulness of the proposed structure in years to come, decided that the adoption of a locomotive of a design similar to the one illustrated would enable them to haul nearly double the number of cars around the sharpest curves without increasing the load per running foot of the structure. The illustrations are taken from *Engineering*, London, which contains further description than is here given, together with an inset showing the locotive quite completely.

A satisfactory material for general use in brake-shoes is hard to find, because so much depends upon the material of the tread of the wheel upon which the shoe is to be used. Sweeping statements against any one kind of material ought to be made with much caution, because of the fact that each class of brake-shoe may have its own peculiar field in which it is superior to all competitors. There is no certainty that a metal can be found which will answer all of the requirements of the different conditions to be met in actual service. For instance, it is stated on good authority that cast steel brake-shoes for locomotive drivers are giving such gratifying results on some roads that their adoption as a standard is almost a certainty, while on the other hand the same authority states that the cast steel of the same kind does not work satisfactorily on a chilled cast iron wheel. In other words the whole truth may be stated thus: There are as many kinds of cast steel shoes as cast iron shoes, and as many kinds of both as there are varieties in wheel metals. For each wheel tread there is a satisfactory shoe material. It may be one of the many varieties of cast steel, or it may be one of the different kinds of cast iron. The selection is so difficult to make from among the large varieties of both kinds of material that it cannot be expected that the most desirable will be chosen at first, or that the relative advantages of the two metals will be easily determined; but one thing is certain that both cast steel and cast iron are being used for driver brake shoes with results which show the advantages of both when properly selected; and here is the whole question, a proper selection of the grade of material, whatever be its kind.

Every year sees applications for charters for elevated railroads in Boston presented to the legislature. No sooner is one defeated than another comes up. This alone is sufficient evidence that there is a wide demand for better railroad facilities for that city and its suburbs, and the fact that the demand has not been met is evidence also of the peculiar difficulty of the problem. The current number of the *Journal of the Association of Engineering Societies* contains papers and discussions on the subject of rapid transit for Boston, covering 24 pages, with a map of the city showing existing railroads in the area included within a radius of 10 miles from the City Hall. Mr. Henry Manley proposes a comprehensive scheme. He would have a line built through the city, to span the circle of about one mile diameter, on the circumference of which the terminal stations of the railroads now lie, and would have the railroads run their local trains interchangeably over each other's tracks, running them through from the extreme suburban stations on one side of the city to those on the other, as, for instance, from Dedham to Salem. The various roads would enter this connecting line by inclines at suitable points. By this system he would avoid the loss of time and space which is inevitable where the end of all train runs is in a city station. As to the route, the engineering character or the cost of this union railroad, Mr. Manley enters into no discussion. Besides the great convenience to the public of quick transit from the suburbs directly to the heart of the city, with no changes from railroad to horse cars, the terminal stations of the existing roads could be reduced in number and in area. Mr. Albert H. Howland, in a study of the subject quite independent of Mr. Manley's, arrived at the same solution. Mr. Clemens Herschel, in discussing this project, considered that the arguments brought against it were completely answered by the experience of the Berlin metropolitan road, which is built and worked on essentially the same system. The plan was, however, opposed by various members of the Boston Society of Civil Engineers, before which society this discussion took place. This plan seems to be admirably adapted to the situation of Boston. Within a radius of 10 miles there is a population of nearly 800,000, and the radiating lines of railroad are now so disposed that all of this population is, or could be, very cheaply brought within a short walk of one of these lines. By the connecting road, passengers from every side could be landed within a quarter of a mile of almost any part of the city. Boston is now a city singularly favored with convenient and attractive suburbs. With a system of rapid transit so comprehensive and so complete as that proposed, the growth of these suburbs and the increase in volume of suburban travel would unquestionably be rapid. On the other hand, without an adequate system the growth will probably be less rapid than it has been in the past. The advantages to the existing railroads of a system which will secure to them the traffic they now have and that which is to be developed in the future are obvious.

The agitation in Massachusetts concerning the abolition of highway grade crossings has subsided, for the present at least. The imposing and impressive report of the special commission on this subject seems to have staggered the legislature, and all the bills proposed this session on the subject have been referred to the next year's legislature. The only practical result, thus far, from the general discussion of the matter, is the amendment which was tacked on to the law permitting the Boston & Albany to increase its capital. This road was required to spend the first million dollars of the proceeds of its new stock for this purpose, and thus is the only company in the state yet affected. A fact, by the way, which did not come out in the discussion of the special commission's report is the statement, by the commissioners, that their estimates of the cost of abolishing the grade crossings of the state (which aggregated $40,000,000) were in all cases calculated for masonry arches. Connecticut has just commenced to follow the lead of Massachussetts. The lower house of its legislature has passed a bill prescribing the method of making changes in crossings and saddling the whole cost of changes upon the railroads. It is not likely that such an extreme measure will pass the Senate without modification. The railroad commissioners have prepared an estimate of the cost of eliminating the 1,200 crossings in the state, but the pending bill allows damages not only to property owners whose lands adjoin the crossings, but also to those "in the vicinity," so that figures are necessarily incomplete. Leaving out such consequential damages, the Commissioners estimate the expense for the construction of crossings and for damages to adjoining properties at $20,638,627, as follows:

New York, New Haven & Hartford	$10,210,000
New York & New England	5,380,000
Housatonic	2,496,000
New London Northern	660,000
New York, Providence & Boston	384,000
New Haven & Derby	340,000
Meriden, Waterbury & Connecticut River	216,300
Hartford & Connecticut Western	740,000
Shepaug, Litchfield & Northern	182,327
South Manchester	30,000

The actual cost of eliminating twelve crossings between Mamaroneck and Port Chester, on the New York, New Haven & Hartford, was $288,152, with a minimum of $9,000, and a maximum of $62,939.

The case of the last road on the list constitutes a simple concrete example of the severity with which a radical law on this subject would bear upon most railroads. The South Manchester road is 2¼ miles long, and its capital is only $40,000. Its last reported annual gross earnings were $17,000, some $2,700 less than the expenses for the same year. The road does not average so badly as these figures indicate, but the sum mentioned as necessary to make its crossings safe approaches an amount double its annual gross earnings, in any event.

Lessons of English Accidents.

We give on another page of this issue an installment of the interesting lessons from train accidents on railroads of Great Britain, giving a class of information which it will be remembered we have drawn from former reports of the Government inspectors who investigate these matters in that country. While many of the conditions under which trains are operated are quite different in the two countries, it remains true that the facts discovered concerning the causes and results of serious train accidents almost always have a bearing which is instructive to railroad men in any country. Even admitting that the more serious accidents in this country are honestly investigated and the results given to the public, it is still to be remembered that the officers of the Royal Engineers of the British army, who have for many years acted as inspectors for the Board of Trade, have acquired a special skill and intelligence in their work, and that their experience is therefore of exceptional value. Their reports of investigations, which we would gladly reprint at greater length for the benefit of our readers if space were available, give internal evidence of much care and painstaking, not only in their preparation, but in the gathering of evidence, both near and remote, concerning the questions at issue. Elaborate diagrams are prepared in the case of very serious accidents, or wherever they will give material aid in explaining the facts. No publication in this country is to be compared to these reports in completeness, with the exception perhaps of the special reports made by the Massachusetts Railroad Commission on a few of the worst accidents in that state during the past two or three years.

While crediting the English inspectors with special ability we must, however, conclude that the first case mentioned in our present summary, the derailment of a fast passenger train near Holywood, Scotland, affords an instance of an unsatisfactory investigation, at least for American readers. A very bad distortion of track is believed by General Hutchinson to have been caused by the centrifugal force of two engines of moderate weight, on a very easy curve, running at a speed probably under 60 miles an hour. The sleepers in the track were 9 ft. long and of 5 × 10 in. section; there were 11 of them to each rail (30 ft.) and their ends were "well covered" with good dry gravel ballast. The accident occurred at midnight, and not at the hottest season of the year, so that, in the absence of evidence, any extraordinary crowding of the rails by excessive expansion seems unlikely. The wheel base of each engine and tender being 50½ ft., most people will agree with the inspector that the distortion of the track, if produced by centrifugal force of the train, must at least have been well begun by one engine alone; but as trains run faster than this, over sharper curves, and with engines as heavy or heavier, every day, the whole theory that centrifugal force caused the derailment must be received with considerable doubt. In fact, General Hutchinson states his views with a somewhat doubtful air. He says nothing about the tamping of the sleepers or the width of the ballasted road bed. Sleepers only 5 in. thick seem rather light for first-class track, though the English practice of embedding them deeply in the ballast

perhaps makes a depth of 5 in. there equal to one of 6 in. in American practice.

One of the most surprising facts shown in the reports is the statement in connection with the collision on the Great Eastern at Bow Road, where it is apparently clearly stated that the company expects a distant signal to protect a train as fully as a home signal. This requirement is to be found in the rules of some roads of this country, but we hardly expected to see it in force on a road which has had all the advantages of the long experience of the English lines. The legitimate office of a distant signal is simply to warn the runner of his proximity to the home signal, and to give him an indication of the position in which he may expect to find the latter. There can be no other possible use for it. If it is required to afford absolute protection to any portion of the track between itself and the home signal, its meaning is at once confused and the understanding of the engineers concerning it is inevitably befogged. The engineer approaching it with the understanding that he must expect an obstruction immediately after passing the signal is really deprived of any distant signal whatever. He simply has to expect two home signals, and the slackening of his speed to prepare for stopping at the danger point must be begun wherever his judgment may dictate; whereas the fundamental idea of a distant signal is to partially or wholly relieve him of the duty of exercising his judgment on that question. By a rule of the kind we are now speaking of, the main object of a home signal, which is to enable main line trains to run at high speed in spite of fog or darkness, is almost entirely nullified.

The locking of buffers, which is believed to have been an important contributory cause of the derailment at Holywood, is also mentioned as having occurred in the accident at Liverpool street, as well as one other. American railroad men can find here one more source of satisfaction in the simplicity of the buffing and coupling devices in use in this country. With all our woes in connection with the coupler question, we are yet free from the troubles arising from corner buffers.

The Canadian Pacific.

The first thing that strikes the reader of the Canadian Pacific report is the extreme lowness of the average receipts per ton-mile or passenger mile. For the past three years these have been as follows:

	Per ton-mile. Cents.	Per passenger-mile. Cents.
1886	1.10	2.10
1887	1.01	1.98
1888	1.02	1.79

This is lower than the average ton-mile rate for 1887 in the United States, which was 1.06 cents, and much lower than the average passenger rate of 2.28 cents. Still more strongly does the contrast show itself when we make our comparison with roads running through newer sections of the United States. For example:

	Average receipts, 1887. Per ton-mile.	Per passenger-mile.
Northern Pacific	1.63	2.73
St. Paul, M. & M.	1.36	2.24
Union Pacific	1.27	2.30
Atchison, Top. & Santa Fe.	1.35	2.36

Even if we make our comparisons with roads which haul similar products through much more thickly settled districts, the rates of the Canadian Pacific are still found to be lower:

	Average receipts, 1887. Per ton-mile.	Per passenger-mile.
Chicago, Milwaukee & St. Paul	1.09	2.54
Chicago & Northwestern	1.10	2.29

It is a pity that the Canadian Pacific does not give figures of train mileage, so that we could explain the anomaly of a road which handles sparse traffic at low rates. It can be partially accounted for in three ways: In the first place the average haul on the Canadian Pacific is much longer than on its American rivals.

	Av. length of freight haul.
Canadian Pacific	314 miles.
Northern Pacific	252 "
St. Paul, M. & M.	266 "
Union Pacific	285 "
Atch., Top. & Santa Fé	237 "

This difference is quite appreciable, and, as far as it goes, is a good explanation of the low Canadian rates. Long-distance traffic is so much cheaper than short distance that the difference in rates, as far as it can be accounted for by this cause, may be described as apparent rather than real. But we can hardly account for the whole difference in this way, particularly as the average length of passenger haul on two of the American roads named in the table is greater than that of the Canadian Pacific, without its producing any visible effect on passenger rates.

A second cause which perhaps has a slight effect in enabling the Canadian Pacific to make lower rates is the Government subsidy. The importance of this is much exaggerated in the popular mind. Its direct effect probably amounts to little; but given, as part of it is, in the form of a temporary guarantee of dividend, it enables the directors to work more for the future and less for the present than would otherwise be the case. A man who is working for the present only keeps rates high in doubtful cases; a man who is working for the future is more likely to reduce them. It is in this indirect way, rather than in any other, that the influence of the pecuniary assistance from the government makes itself felt.

The low rates, and especially the low passenger rates, find a third reason in the policy of the company with regard to its land grant. The directors are obviously making a strong effort to dispose of this at good prices, and there is no way of making it valuable which is so effective as low railroad rates. The good results of this policy are already seen. The land sales in 1888 were two and a half times those of 1887; in the first four months of 1889 they have been two and a half times those of the corresponding period in 1888.

The Inter-state Commerce law, by subjecting the American roads to certain restrictions on through traffic, has doubtless done the Canadian Pacific some good, but we see no reason to regard this as a main factor in the growth of that company's business. The passenger traffic of the Canadian Pacific has grown about as fast as its freight traffic, and though the Inter-state Commerce law might have affected the latter, we see no reason why it should have had much influence on the former. Moreover a considerable part of the passengers have been immigrants, and this great increase of settlement is quite enough to account for an increase of freight traffic. As far as the Inter-state Commerce law is concerned the Canadian Pacific is in a very different position from the Grand Trunk. The latter is a direct competitor of American lines; the former, for the most part, only an indirect one. The Grand Trunk has its natural terminus at Chicago, and competes directly with the American trunk lines. The Canadian Pacific seeks the great part of its long distance traffic at points of actual production north of the Canadian border. When the Canadian Pacific pursued its old policy of rigid separation from the United States, this was clearly true; it remains true to-day to a very considerable extent.

A rigid application of the short haul principle to the relative rates of the Grand Trunk for through and local business might perhaps have an important effect on American trade. The effect of applying the same regulation to the Canadian Pacific would be so slight as to be hardly appreciable. It is quite possible our railroads are suffering from the competition of the Canadian Pacific; but it seems wholly impossible that Congress should pass anything in the way of special legislation which would be effective in helping them.

Creating a Trade Centre.

The Railroad Commissioners of Kansas in a couple of recent decisions appear to have taken a new view of their duties. Upon complaint of the city of Wichita, Kan., for recognition in the tariffs as a jobbing centre, the board decided that the position was well taken and that "jobbing" rates must be accorded that city as against Missouri River towns, up to a line 75 miles east of Wichita.

A few years ago we used often to hear the opinion expressed by railroad officers that the best interests of the railroads and of the people demanded the existence of trade centres every few hundred miles. If such a centre did not exist through geographical reasons, it was important that it should be created. Hence the favors so often found accorded a particular town, which rapidly brought it forward as a trading city. Great objection was made to this reasoning. The older cities, against which these jobbing rates to interior towns were made, were unanimous in their opinion that these favors were unjust discriminations against the trade naturally belonging to them. Fierce disputes arose, and charges were freely made of the unrighteous use of railroad power, a power too autocratic for the people's good. The old complaint of Chicago's merchants against Des Moines is a familiar example—a jobbing quarrel which is at the bottom of much of the Iowa troubles of to-day.

Then came the Inter-state law. The Commission, in interpreting that law and in its annual reports, has taken ground against this common practice of favoring the trade centres as compared with surrounding towns. The act to Regulate Commerce, say the Commission, intends that the most obscure hamlet shall be put upon an equality as to rates with the largest city. So far as the act has changed previous conditions, it has undoubtedly tended to abolish tariff or special favors which allowed particular localities to command the trade of their districts. The old idea that it was for the benefit of carrier and people that supplies should be carried cheaply to some point in large quantities and thence distributed, is discountenanced by the Inter-state Commerce Commission.

Kansas City is the great centre for Kansas traffic. Wichita is about 200 miles to the southwest, an ambitious, prospering city, which hopes to secure the trade of Southern Kansas and the newly opened Indian Territory. The older Missouri city, however, holds its own; hence the need of jobbing advantages and "recognition" at Wichita as a trade centre. The State Railroad Commission, in a long opinion, favors Wichita and commands the Kansas roads to make the necessary reductions. The objections of the railroad managers are weighty. There are a dozen or more towns in Kansas each with ambitions like Wichita. Each may be expected to appeal to the Railroad Board for "recognition," and none can be refused. It is only a question of time when the reduction demanded for Wichita will also be asked for the dozen rivals, and eventually for the entire state. The fall in rates and in earnings promises to be a serious matter for railroads whose earnings are already low.

Thus we find the Kansas Board re-affirming the old principle of the trade centre, and of the right and even the duty of the railroads to give to it privileges denied the smaller hamlet. This is in direct conflict with the theories which caused the passage of the Inter-state act. Doubtless the Board would say that in giving jobbing rates to Wichita, they were in reality giving reductions to all the surrounding villages which might buy through Wichita. But this is exactly the argument of the railroad manager, which was met with such a storm of protest a few years ago. As the case stands now in Kansas, trade centres are to be favored as of old, but with changed masters; formerly it was the railroad manager who decided these matters as the conditions demanded; now it is the Board of Railroad Commissioners who give the word. Have we gained by the change of rulers? Clearly not: even to the people, unwise reduction of rates brings but temporary advantage. Is the action of the Kansas Board the first indication of a change in public sentiment from the idea of village equality in rates back to the older one of the public benefit of trade centres? Time will show.

Oregon & Transcontinental.

The annual election of directors of the Oregon & Transcontinental Company takes place June 17, and two parties are struggling for control. The result is yet in doubt, though the Villard faction is generally supposed to have the majority. Wall street takes great interest in the fight, and has shown much excitement because some operators who had sold Oregon & Transcontinental stock short had to buy shares at a high price to fulfill their contracts.

The railroad questions behind this contest are important, but it is very difficult to get at the true state of the facts. Henry Villard has been a notable figure in Pacific Northwest affairs for years, and in this matter may be said to represent the Northern Pacific interest. The Oregon & Trans-Continental Co. was formed principally to hold stocks of other and active corporations. Its best assets are a majority of the stock of the Oregon Railway & Navigation Co. and a part of the stock of the Northern Pacific. The former owns the Portland outlet for both Northern and Union Pacific. For the Union this Oregon line is important; for the Northern not so much so, because the latter has an outlet through the Cascade Mountains to Tacoma on Puget Sound. A compromise was arranged between these two roads by which both were to lease the Oregon Railway and mutually guarantee 6 per cent. This lease was executed by the Union but repudiated by the Northern, because of exorbitant rental, the Oregon Railway running much behind the sum in actual earnings. This agreement further provided that the territory of each road should not be invaded, but this has been disregarded and branch lines built.

The Elijah Smith faction represents the Union Pacific first and afterwards the Manitoba. This latter road, seeing its chance, unites with the Union Pacific, and if successful would find a Pacific outlet easy to its hand, and have besides a powerful weapon to use in its coming fight with the Northern Pacific. If the Union Pacific people get control they could modify their own lease with the Oregon Railway by sitting "on both sides of the table." On the other hand, the Villard faction ask for proxies because they think that the interest of the independent stockholder is plainly with them. They promise an attempt to hold the Union Pacific to its guarantee of 6 per cent. which that company would probably contest in the courts. If the Northern Pacific secured control it would have a commanding position in the Pacific Northwest, with two lines to tidewater.

There are other factors in the problem which should

not be lost sight of; the Oregon Pacific, now advertising its bonds, could be made available as an outlet to the ocean by one of the present contestants if necessary; the so-called Hunt railroads around Walla Walla, sure to be valuable as links or feeders; and the Seattle & Western now building to Spokane, a road for the Manitoba if all else fails; besides these a number of short lines running into rich wheat sections. All make up a number of prizes well worth a struggle by these great corporations. Acute observers predict a brilliant future for Oregon and Washington. Rich in mineral, forest and agricultural wealth, with rivers and coast harbors, these States are destined to increase greatly in population. It is probable that a decided success secured now by one of the Pacific roads, will give that company a permanent advantage. The first step is the control of the Oregon & Transcontinental.

Annual Reports.

Canadian Pacific.—Miles operated, 1887, 4,960; 1888, 5,075, of which 1,242 are leased.

Capital stock	$65,000,000
Funded debt of road	47,908,020
Land grant bonds	18,442,000
Current debt	3,391,128

An effective capitalization of about $35,000 per mile owned, besides the $44,000,000 of subsidies.

	1888.	1887.
Earnings, freight	$8,017,313	$6,924,130
" passenger	3,800,883	3,453,818
Total, including miscellaneous	13,195,535	11,606,412
Operating expenses	9,324,760	8,102,294
Net earnings	3,870,775	3,504,118

The fixed charges for the year were $3,544,351, and the surplus, $326,424.

Of financial operations the most important was the issue of nearly $14,000,000 of land grant bonds, by which means $7,000,000 of unfunded debt was taken up, advances to leased lines were made and a considerable amount of disposable cash was left in the treasury.

Of traffic operations we have the following figures:

	1888.	1887.
Tons freight	2,496,557	2,144,327
Ton miles	784,972,511	687,786,049
Average receipts per ton mile	cents 1.02	cents 1.006
Passengers	2,280,049	2,057,089
Passenger miles	212,766,865	174,687,802
Average receipts per passenger mile	cents 1.79	cents 1.98

The decrease in the rate per passenger per mile was chiefly, if not entirely, due to the large increase in emigration to the North-West and British Columbia, as compared with the previous year—the emigrants being carried at exceedingly low rates.

The result of the past year's working have not proved so satisfactory as was anticipated at the date of the last annual report. This was mainly due to the exceedingly light crop of Ontario in 1887. The deficiency in Ontario was fortunately more than made good by the development of business along the main line, and of the through traffic to and from the Pacific Coast, but this had to be carried at rates affording comparatively small profit. The increase in acreage already seeded in the Northwest for the coming season is much greater than ever before. The light crop of last year in the Northwest brought very high prices, affording even greater profit to the farmers than they have obtained from the heavier crops of other years, and the general trade of that part of the country has not, therefore, suffered appreciably.

The company has obtained the authority of Parliament to issue debentures to cover the cost of steamships with special reference to a service between Vancouver and China and Japan; but the Dominion Government being in negotiation with an independent company for a fast Atlantic Steamship service, and a first class service between Vancouver and Australia, the directors are disposed to surrender the proposed Japan and China service to the same company if favorable arrangements can be made.

The leased portion of the Atlantic & Northwest Railway (the "Short Line" to the maritime provinces) is practically complete and ready for traffic.

An agreement has been reached with the Government, subject to the ratification of Parliament, respecting that section of the Atlantic & Northwest Railway from Harvey to Moncton, New Brunswick (about 115 miles), whereby the Government agreed to construct the line, and the company to work it for 20 years without rental, and to pay thereafter a rental of $73,400 per annum. This agreement is coupled with a traffic agreement covering business to and from the Intercolonial Railway.

The western entrance to Montreal and the Central Passenger station in that city are practically completed; and the eastern entrance to Toronto and the line along the lake front of that city are well advanced.

The extension of the Ontario & Quebec Railway (under perpetual lease to this company) from London, Ontario, to the Detroit River, will be ready for traffic before another winter.

Aside from the Detroit extension, the only new work now in hand is a branch of 10 miles from Mission, British Columbia, to the United States boundary, to connect with Seattle on Puget Sound. Surveys were made for a direct line between Sudbury and Toronto, to avoid the elbow at Smith's Falls; but it was thought better to accomplish the same general result by a traffic arrangement with one of the branches of the Grand Trunk. Connections from Toronto to Hamilton and Niagara Falls are to be provided through the agency of the South Ontario Pacific—a friendly organization; while another "friendly organization" is soon to build a line connecting the Canadian Pacific at Montreal with the Rome, Watertown & Ogdensburg at Dundee. The arrangements for extensive issues of "consolidated debenture stock," proposed a year ago, have now been completed.

The Housatonic parallel to the New York, New Haven & Hartford, has been defeated in the Connecticut legislature by a decisive majority. Not content with the refusal to encourage this parallel by special legislation, the legislature proposes to amend the general railroad law by refusing to allow *any* parallel scheme to obtain the benefit of its provisions until it has obtained the approval of a Superior Court Justice. The object aimed at is a sound one; we question whether this is the best way to secure it. To make the construction of a new line depend on the approval of an individual would be a farce in some cases, and a hardship in others. The Connecticut law in its old form has worked very well thus far. Apart from and beyond all provisions as to nominal amount of stock and percentage which must be paid in cash at the outset, it also provides that bonds can only be issued to an amount equal to what has already been expended; in other words, that at least half of the actual investment must be subscribed by stockholders and not borrowed. This has been found sufficient in the past to prevent the construction of parallel roads. That is a thing which speculators prefer to undertake with other people's money rather than with their own. How great has been the effect of this clause, is shown by the efforts to secure special legislation for parallel lines whose promoters were unwilling to build under the general railroad act. If any further obstacle is to be thrown in the way of useless railroad construction, it seems wisest to do it by increasing the proportion of stockholders' investment. The New York, New Haven & Hartford seems likely to get pretty much what it wants. The original form of the bill has been somewhat modified, so that the amount of stock which may be issued is no longer unlimited, but the limit has been placed so high as not to make any trouble. The present stock capital is $15,500,000. The bill now before the Connecticut legislature provides for a possible increase of $35,000,000. Less than half of this will probably be used to retire bonds or leased line stock, leaving about $20,000,000 disposable. If the bill passes, such stock will be offered to present stockholders at par, and the money will be employed in four-tracking the New York division, in changing grades, and in building new stations.

The prosecution of the New York, New Haven & Hartford by the Attorney General of the State of New York, for non-compliance with the law forbidding individual heaters in cars of passenger trains on roads of more than 50 miles in length, has been carried to the extent of getting judgments against the company for penalties aggregating $7,000. Justice O'Brien, in the Supreme Court, New York City, issued the decision this week. It will be remembered that the defense of the company was based on the fact that the portion of its line lying in New York state is less than 50 miles long. The contention of the state was that the 50-mile limit was intended to apply to small roads and that the intent and meaning of the phrase in the law was to that effect, it being assumed that a road whose total length was within this limit would presumably run but few trains and those at low speed. The judge says in his decision that the act "being a police regulation which the Legislature had the right to enact, and the same not conflicting with any Federal or state restrictions upon the legislative power in this regard," he is of opinion "that the act is valid, and that it applies to the defendant railroad, which is more than fifty miles in length, although having but twenty-four miles within this state. This seems to me to be the fair, natural and reasonable construction to be given to the acts."

The reported testimony of the officers of this road at the recent hearing before the Connecticut Commissioners on the subject of heating indicates that the company is opposed to all the systems of continuous heating which have thus far been brought out. As the faults of the best known systems are wholly matters of detail or of efficient care and inspection, it is somewhat difficult to understand exactly what the attitude of the New Haven road means. Nothing is plainer than that public sentiment demands continuous heating, and it is equally clear that an overwhelming majority of mechanical officers of railroads who have investigated the matter are agreed as to the great economy of fuel sure to be effected by its use. If it be assumed that this road is simply holding off for the purpose of having all the experimenting done at the expense of other people its action at once appears consistent.

The Hawkesbury Bridge, in New South Wales, was opened for traffic on May 1 with great ceremony, in the presence of the Governor and many distinguished men. This bridge was built by the Union Bridge Co., of New York, and is especially noticeable for the great and unprecedented depth of the foundations, some of the piers being sunk 160 ft. below high water mark. The bold and ingenious method by which the spans were erected on a pontoon and then floated to position was fully described, with illustrations, in the *Railroad Gazette*, Aug. 10, 1888. The opening of this bridge completes all rail communication between Adelaide, in South Australia, and Brisbane, in Queensland, the route passing through Melbourne and Sydney, the chief cities of Victoria and New South Wales, the other two principal colonies in Australia. The total distance is 1,812 miles. The worst grades and sharpest curves occur in New South Wales, where the country is very mountainous and broken. Grades of 176 ft. per mile are frequent, and curves of 8 deg. 40 min. The highest summit is 4,471 ft. above sea-level. These obstacles to rapid traveling are not lessened by two breaks of gauge, Queensland, on the north, having a 3 ft. 6 in. gauge, while the New South Wales lines are of the standard gauge, and Victoria and South Australia have the 5 ft. 3 in. or Irish gauge. The through express, however, runs from Melbourne to Sydney, 580 miles, in 19 hours, giving a speed of 30 miles per hour, including stoppages and change of cars at the border where the break of gauge occurs.

The statements widely published throughout the country to the effect that the circular of the Inter-state Commerce Commission regarding safety appliances for railroad trains had been sent to "labor organizations," is somewhat misleading, the chief recipients of the circular being the various state railroad commissions. The circular has been sent to various experts besides, and also to the Chiefs of the Brotherhood of Locomotive Engineers, the Order of Railway Conductors, the Brotherhood of Railroad Brakemen, the Switchmen's Mutual Aid Association and the Brotherhood of Locomotive Firemen. While the general state of affairs at present existing is pretty well known to the readers of the *Railroad Gazette*, so that they cannot expect much new information as a result of the inquiries now put forth by the Commission, the scope and purpose of the circular are good, and much benefit may be derived from the answers sent in if those who are able to give accurate information will take the pains to do so. The history of safety appliance legislation in each state needs to be succinctly written up, and the Commission should be able to compile it in readable shape. Those roads which are using freight train brakes or automatic couplers can do the public a good service by stating in an effective manner the degree of progress thus far attained. The question what to do with the information obtained is a more difficult matter.

A press dispatch states that the Chicago, Milwaukee & St. Paul has discontinued the operation of its branch to Estherville, Ia., which is 23 miles long, leaving the main line of the Iowa & Dakota Division at Emmettsburg. The Burlington, Cedar Rapids & Northern has a parallel line between these points, and it is stated that a contract has been made with the latter company to handle the traffic. At Fort Dodge, in the same state, the Chicago, Rock Island & Pacific has just been ordered by the Railroad Commissioners to resume operation of a short branch, which it had discontinued the use of in consequence of an amicable agreement with a parallel road. Whether this sort of economy will be any less distasteful to Estherville than to Fort Dodge remains to be seen.

A recent issue of the Fort Dodge *Messenger* (Iowa) contains a long communication from Mr. L. S. Coffin, whose name has been well known for many years, both as a railroad commissioner, and because of his untiring and self-sacrificing work in behalf of railroad employés. The communication divides itself into two parts. Mr. Coffin first replies to those who have asked him why he does not say something about what they call the "spite work" of the railroads as against the interests of the general public. Mr. Coffin shows first the absurdity on the face of things of assuming that the railroads can or will put themselves into an attitude of opposition to the public, as they are dependent upon its good will, not only for their prosperity but for their very existence. From long acquaintance with the general managers and higher officers of the railroads that serve Iowa, he is convinced that their great anxiety always is how best to please the public. He then shows how business in Iowa has recently declined. First, from the failure of the oat crop; second, from the low price of corn, which completely stopped the movement of that commodity; third, from the mild winter, which decreased the coal trade at least 50 per cent.: and finally, from the effect of hostile legislation, which frightened capitalists and stopped the extension of railroad building and the increase of railroad facilities in that and other states. The great business of hauling supplies for new roads was cut off, and the employment of all those great industries which go to supply rails and equipment was curtailed. From the great decrease in revenues there necessarily follows a decrease in public service, for the railroads are obliged to economize. He asks for fair play from the public for the railroads, and that both sides should be heard, and accuses the Legislature of 1888 of insincerity, and of striving to make political capital in its action on railroad matters.

The proof of this forms the second part of his communication. Here he presents figures showing the great number of railroad employés killed and maimed in the state. In 1888 349 trainmen were killed or injured by causes that could have been removed by proper legislation. Before another legislature can take action another report of the State Commission will appear, and there is no reason to suppose that the casualties shown in that will be less, making a total of 700 young men whose death or mutilation will have occurred before another assembly can take any action toward doing what the legislature of 1888 did not do. Of course it is well known what Mr. Coffin thinks the state should do—that is, to compel the adoption of the M. C. B. coupler and of continuous automatic brakes. He says: "To my mind that legislature (of 1888) is virtually guilty of manslaughter. The future writers of Iowa history will hold up that legislature and some of her state officials to the merited scorn of intelligent readers. The facts were laid before them officially. They were bound to know them; only wilfully could they be ignorant of the record of the last nine years, showing 2,000 trainmen either killed or injured." To him it is almost

beyond the possibility of belief that men intelligent enough to be members of the legislature should utterly ignore these startling facts and spend their time on bills of questionable utility. He suggests that it would be desirable that every Senator and member should do duty as a brakeman on freight trains for one whole day and night before taking his seat in the capitol. "The only drawback would be that there would be so many special elections to fill vacancies I fear there would never be a quorum to do business."

In response to an invitation issued by the Illinois Steel Co. and Fox Pressed Steel Co. to the railroad managers in the vicinity of Chicago, a number of railroad officers and heads of mechanical departments assembled in the Rookery building, Chicago, on Tuesday last, to consider the advisability of using steel and iron in freight car bodies and truck construction. Mr. Kirby, Master Car Builder of the Lake Shore presided. As the proceedings were not to be made public all reporters were excluded. The object of the meeting was to call the attention of railroad men to the advantages of steel and iron in freight car construction with the hope that in the near future railroad corporations would see the advantages of using metal in the place of wood, and thus while obtaining a more satisfactory freight car equipment, also afford an outlet for steel products in this country. While the company in issuing the invitation was to some extent advertising its peculiar products, yet the work was also a missionary one, the object being to show railroad men how much could be done by themselves in metal car construction without the aid of patented designs and products. To this end, designs of a car made largely from commercial shapes at a cost not greater than that of the best wooden cars were exhibited in details and discussed.

As stated by the officers of the Steel Company the primary object was to forcibly call the attention of railroad men to the fact that the price of metal at the present time is so low that satisfactory metal cars of less weight and greater strength could be constructed at prices very far below all previous estimates. This fact was brought prominently to the front with the hope that railroad men would at their leisure think the matter over and for themselves devise metal cars, and by increasing the demand for steel and iron, afford a new field for such products. Those present spoke with considerable freedom and the designs of the cars and trucks were well criticised. Messrs. Kirby, Wall, Schroyer, Gibbs, Miller, Snow and others, spoke at length regarding the devices presented, but more particularly upon the needs of the railroads in general in the matter of special metal shapes. Two papers were read, one by Mr. Hughes, Chief Engineer of the Fox Pressed Steel Co., upon the designs of metal trucks and cars in India and upon a design of metal car which he deemed best suited to the needs of American service. Only a few of the devices described by him were patented. The other paper, by Mr. Barnes, Consulting Engineer of Chicago, treated of statistics of metal and wooden cars used in this country, and cited the objections to metal cars which have been made by various American railroad men. This paper was accompanied by a full set of elevations and details of a car constructed principally of commercial shapes of metal, of a form which might be expected to meet the demands of American service, and which could be readily repaired without the aid of special tools.

NEW PUBLICATIONS.

Journal of the Association of Engineering Societies.—The May issue of this journal contains the following papers: Annual Address of the Boston Society, by Desmond FitzGerald, Superintendent Western Division Boston Water-Works, etc.; Some Tests of Full-Sized Angle Irons, by Charles F. Loweth, City Engineer, St. Paul, Minn.; The Winding of Dynamo Fields, by Prof. F. E. Nipher, Washington University, St. Louis, Mo.; Rapid Transit in Boston, by Henry Manley, City Engineer, Boston, Mass., and Albert Howland, with a discussion by various members of the club; Legislative Control of Railways, by Edwin E. Woodman, Secretary, Chicago, St. Paul, Minneapolis & Omaha Railway. The proceedings of the various societies in the Association are also given, together with the usual Index to Current Literature.

TRADE CATALOGUES.

Illustrated Catalogue of Rand Drill Company, New York. 1889. 8vo, pp. viii., 195.

This catalogue is divided into four "Books:" Machinery, including drills, air compressors, boilers, air receivers, pumps and supplies, pipe and fittings; Useful Information on compressed air, steam, transmission of power, and miscellaneous data; Work Done in mines, quarries, tunnels, under water, and in miscellaneous localities; Comparisons and Tests.

While the catalogue naturally shows the superiority of the plant manufactured by the Rand Drill Co. it is fair to say that the statements are supported by disinterested testimony, for the most part. As an illustration, it is well-known that in compressing air, cooling devices are necessary to absorb the heat of compression. There are two general methods employed for cooling the air, either by injecting water into the cylinder, or by allowing water to circulate around cylinder sides and heads and through piston-rod and piston. The latter method is adopted by the Rand Drill Co., and they quote data from an extended series of experiments showing that there is slight economy in this method over cooling by injection; and they add that there is considerable mechanical advantage from the fact of obtaining drier air; but several forms of their compressors will be fitted with spraying devices, if required, even though they do not recommend it.

The catalogue is fully illustrated, showing not only the special machinery manufactured by the company, but also many applications, with data of the performance, from official reports. Complete directions for setting boilers and compressors are furnished. There are illustrations of the various tools and fittings required, and schedules of the outfits required for different kinds of work. The rock drills are made both for full admission and for expansion of the motive fluid, and records of experiments are quoted showing the consumption of air and steam in practical work. The air compressors are also built in various styles, from the machine with non-expansive motive cylinder to the compressor with a compound condensing engine and Corliss valve motion.

The practical information treats of the care of machinery, its proper proportions, shafting, gearing, belting, etc., and, altogether, this catalogue is one of unusual interest and value.

TECHNICAL.

Locomotive Building.

The Old Colony Co. is building at its South Boston shops the last of four large locomotives. The company will also build a small locomotive soon.

The Baldwin Locomotive Works are building 15 locomotives for the Missouri, Kansas & Texas.

The Newport News & Mississippi Valley Co. has just received six standard passenger locomotives, with 19 × 24 cylinders, from the Cooke Locomotive Works.

The New York Locomotive Works, of Rome, N. Y., are building four 8-wheel passenger engines for the Mobile & Ohio.

The Louisville, New Orleans & Texas is having built 15 engines at the Schenectady Locomotive Works, 10 being for freight service and 5 for switching.

Car Notes.

The Baltimore & Ohio is constructing at its shops at Mt. Clare, Md., six postal cars.

The Indianapolis Car & Manufacturing Co. has completed 100 of the fruit cars it is building for the Louisville & Nashville.

The Michigan Car Co., of Detroit, has recently taken a contract for 600 34 ft. box cars of 60,000 lbs. capacity for the Toledo, St. Louis & Kansas City.

Two new passenger cars have been received by the Western of Alabama.

The Cleveland, Columbus, Cincinnati & Indianapolis has received all the equipment which was contracted for last February, and now has in service 1,400 more freight cars and six more locomotives than on Feb. 1.

The Lafayette car works are building 25 refrigerator cars for the Ohio & Mississippi road.

The Jackson & Sharp Co. is building several passenger cars for the Chateaugay road.

Bridge Notes.

A project for a free bridge at Manayunk, Pa., near Philadelphia, is being agitated. The bridge is to be 350 ft. long, with two spans of 160 ft.

The Chicago & Eastern Illinois has contracted for an iron bridge over the Wabash River at Clinton, Ind.

The commissioners' court of Lauderdale County, Ala., have awarded the contract to build two iron bridges to the King Iron Bridge Co., of Cleveland, O., at $19,000.

The Berlin Iron Bridge Co., of Berlin, Conn., was the lowest bidder for the two new bridges on Dwight and Cabot streets, Holyoke, Mass. The company's estimate was $15,630, or $630 more than the appropriation.

The Asheville Toll Bridge Co. will build a two span iron bridge, at Asheville, N. C. It will be 260 ft. long and probably 30 ft. wide.

The Lehigh Valley has obtained permission from the courts to erect a bridge near New Ringgold, Pa.

Plans have been prepared for the new building for the Louisville Bridge & Iron Co. It is to be one-story high, 300 × 82 ft., of brick and stone, and cost about $27,000.

The San Francisco Bridge Co. has the contract to build a bridge across Arroyo Grande Creek, San Luis Obispo, Cal.

The Lafayette Bridge Co. has been incorporated in Indiana with a capital stock of $20,000, and a board of directors composed of W. Marshall, George W. Broughton and Henry W. Marshall.

Cofrode & Saylor, of Pottstown, Pa., have the contract for the bridge across the Schuylkill River at City Avenue, Philadelphia, Pa. The structure is to be an iron rectangular truss deck bridge, and will be 606 ft. in length, and wide enough for two carriages to pass, with foot walks on either side. It will connect City avenue, the dividing line between Philadelphia and Montgomery counties, with East Fairmount Park. There will be five spans, two 114 ft. long, one 170 ft. and two 153 ft. long. It will cross the Philadelphia & Reading above grade. The bridge will have an ascent in grade, towards the west end, of 18 in. to the 100 ft., and will be about 60 ft. high from the water's level to the top of the bridge.

Sealed proposals will be received by the Joint Board of County Commissioners for the counties of Hampden and Hampshire, Mass., until 12 o'clock June 17, for the superstructure of a wrought-iron, riveted-lattice bridge over the Connecticut River between Holyoke and South Hadley, Mass. Copies of the plans and specifications can be obtained about June 1 on application to E. S. Shaw, Consulting Engineer, 146 Franklin street, Boston, and can be seen at the City Engineer's office, Holyoke, Mass. The proposals are to be sent to Leonard Clark, Chairman, Springfield, Mass. The bridge will consist of 10 spans of about 160 ft. each, 46 ft. wide inside of hand rails, trusses 32 ft. apart on centres.

Manufacturing and Business.

The Morgan Rail Joint Co. has been incorporated in New York to manufacture and sell, and to license others to manufacture and sell, joints for railroad tracks and other track appliances. John McKenzie, Morris S. McKenzie, Robert Black, Henry A. Cox and Joseph Peabody are the trustees. The principal office of the company is to be at Troy, N. Y.

The American Brake Co.'s shops are full of orders for the company's locomotive brakes this month, and the force is compelled to work over time to make promised deliveries.

The Butler Draw-bar Attachment Co. has removed its office from New York to the Phœnix Building, Chicago, Ill., where all correspondence should be addressed.

The labor disturbance in the works of the Syracuse Tube Co. has been adjusted, and the company is now running all its mills full time in all departments.

The Wainwright Manufacturing Co., of Massachusetts has been recently organized under the laws of the state, and succeeds to the business of the Wainwright Manufacturing Co., of Medford, and will continue the manufacture of heaters, filters, expansion joints, surface condensers, corrugated tubing and gaskets, besides carrying on a general machine and foundry business. The officers of the new company are Jere. Abbot, President; John A. Loring, Vice-President; Geo. D. Hall, Jr., Treasurer; John F. Fife, Superintendent.

The Bailey Fusible Plug has been adopted, or is extensively used, by the Baldwin Locomotive Works, the Pennsylvania, Chicago, Burlington & Quincy, East Tennessee, Virginia & Georgia, Keokuk & Western, Louisville, New Orleans & Texas, Cumberland & Pennsylvania and Intercolonial of Canada. It is also used by many important iron, supply and steamship companies.

The Western Fence Co., of Chicago, has closed contracts with the Chicago, Rock Island & Pacific for fencing the unfenced part of its lines in Iowa, 350 miles, with 5-barbed wires and cedar posts, also gates and cross fences. The company completed last year nearly 2,000 miles of fence for the same road in Kansas and Colorado.

Large orders have been placed this week for the Servis tie plate by the Maine Central, for 20 miles; by the Chicago & Northwestern, and other roads; and the Pennsylvania has placed trial orders for same.

The Dunham Manufacturing Co. now offer the Davies spike in connection with the tie plate.

The Barney & Smith Mfg. Co., of Dayton, Ohio, is building six passenger and two baggage cars for the Louisville, New Orleans & Texas.

Iron and Steel.

The Glenmore Iron Co., of which Gen. J. R. Anderson, of the Tredegar Iron Works, Richmond, is President, will erect an extensive plant near Glenmore, Va., where it has acquired 3,000 acres of land, upon which there is a vein of iron ore 40 to 60 ft. thick and 6 miles long, which can be mined by open cutting.

Furnace A, of Carnegie Bros. & Co., Limited, of Braddock, Pa., has been blown out for relining and other repairs. It will be ready for blast again about July 1.

S. R. Seyfert's large rolling mill at Seyfert's Station, Pa., has resumed operations, after an idleness of over two months. It resumed with plenty of orders on hand, and will run on double turn, giving employment to 225 men.

The new sliding scale proposed at Mr. Carnegie's Homestead plant will take effect July 1, the date of the expiration of the amalgamated scale. It will cause an average reduction of 20 per cent., and will fall most heavily on the higher-priced men, who will be cut in some instances from 50 to 60 per cent. The new scale made up is on the basis of $27.50 per ton for steel blooms, with the minimum at $25. It is similar to the one in operation at the Edgar Thomson plant of the same firm, with the exception that the scale will be based on blooms instead of rails. As the workmen had notified the firm that an advance averaging 68½ per cent. would be demanded on July 1, a strike of the 2,500 employés is probable, as they have rejected the scale. The company is making preparations to meet any trouble that may occur.

The blast furnace of the Paducah Iron Co., at Paducah, Ky., will be put in blast during the summer. This furnace formerly belonged to the Nova Scotia Iron Co., of St. Louis. It was removed from Salem, Mo., to Paducah in 1888.

The 24-inch mill of the National Tube Works Co., at McKeesport, Pa., was put in operation last week to fill a large contract for 8-inch pipe. It has been idle for some time.

Soho Furnace, of the Moorehead-McCleane Co., produced 5,520 gross tons of pig iron during the month of April.

The two blast furnaces of Schoenberger, Speer & Co., of Pittsburgh, produced 5,354 gross tons of Bessemer pig-iron during the month of April last.

The stockholders of the Henderson Steel & Mfg. Co., of Birmingham, Ala., have voted to increase the capital stock $60,000. The company will build an open hearth furnace of fifty tons capacity per day, for which drawings and estimates are now being prepared.

The Rail Market.

Steel Rails.—No large sales have been made in the East, but there is considerable inquiry from the South, and a number of small sales have been made. Chicago also reports many small sales, with a number of inquiries. The Pittsburgh mills have a supply of orders and the prices are firmer. Quotations are $26.50@27.50 in the East, $29.50@$30 at Chicago, and $25@26, cash, at Pittsburgh for heavy sections.

Old Rails.—Quotations are: In the east, $22@$22.50 for tees; at Chicago, $20 for old iron rails; at Pittsburgh, $21.50 @$21.75 for old iron rails, and $17@$17.25 and $19@ $19.50, according to length.

Track Fastenings.—Spikes are $2, and splice bars $1.65@ $1.75, both at New York and Pittsburgh.

Manufacture of Aluminum in France.

A French company calling itself the Société Electro-metallurgique has just commenced the manufacture of aluminum alloys by the Héroult process. The works are at Froges (Isère), and are equal to a daily output of 3,000 kilogrammes of alloys. The current is produced by two dynamos, each giving 7,000 ampères and 20 volts. These dynamos are separately excited by a machine giving 350 ampères and 65 volts. The motive power is obtained from two vertical turbines of 300 horse-power each.

Manufacture of High Explosives in Great Britain.

From the last annual report of the Government Inspectors of Explosives it appears that the number of deaths from accidents in connection with the manufacture of explosives was six only in 1888 and the average for the past ten years now stands at 7.3, a most gratifying contrast with the state of things which prevailed prior to the act of 1875 coming into operation, when the average for the four immediately preceding years was 37 per annum, while the annual average in the English and Welsh factories alone during the years 1868 to 1870, when no sort of inspection whatever existed, was 43. The inspectors now have 112 factories on their books (many of them for the manufacture of new explosives, with new risks and new difficulties), as against 55 in the beginning of 1876. An important step has been taken by the War Office during the year in the appointment of a committee of chemists for the purpose of specially investigating and dealing with questions relating to explosives for use in the naval and military services. Hitherto there has been no one person or body of persons charged with the specific function of giving sustained attention to the subject of naval and military explosives, and there can be no doubt that the country has suffered in this respect. The committee consists of Sir

Frederick Abel, Professor Dewar and Dr. Dupré, and they are charged with the duty of watching the progress of practical development in this direction. During the past year some fifteen explosives of various classes have been added to the list authorized by the government, including carbo-dynamite, securite and bellite. Some relaxations have taken place with regard to the storage of mixed explosives in the same magazine. As time goes on, and more care is taken in packing and in other details, further concessions will doubtless be made. There appears to have been no accident by fire or explosion in any magazine during the year, but for all this the inspectors are requiring the improvement of the structural security of magazines according to a very judicious specification which they set forth.

Only one accident occurred during the year in the conveyance of explosives, and that was only of a trivial character, being caused by a train running away down a steep incline. As regards the visits of inspection made by the inspectors during 1888, their number is 1,794, which largely exceeds that of any previous year.

Railroads in Switzerland.

Activity in railway construction, of which I spoke in one of my previous letters, is on the increase. This fact will best be understood if I mention that at present no less than thirteen rack railways and eight cable railways are either in course of construction or planned. Of the rack railways five are already far advanced, and will probably be in active operation during the coming tourist season, whilst of the eight cable railways three are nearly completed. The service of trains for the Gothard will be further accelerated and the Gothard Company have announced that the total time occupied by the journey from Berlin to Milan *via* the Gothard Railway will, from June 1 next, be only twenty-nine hours and thirty-nine minutes, the return journey being performed in thirty-one hours and twenty-one minutes. The earth works for the new Prattigau line are so far completed that on the 1st inst. the work of laying the rails was commenced, and the railway will be in practical operation during the coming tourist season.—*Winterthur Correspondence—Industries.*

The Portelectric Railroad System.

An exhibition of what is known as the "Portelectric system" of transportation was given at Boston on May 14, apparently for the purpose of securing financial support by the usual and well-known methods of exploiting electrical inventions. The peculiarity of this system is the more direct application of the current to a car than in the ordinary electric railroad. This is effected by causing the car itself to be acted upon in passing through a series of coils, energized by electricity, which exerts an attractive force immediately in advance of the moving vehicle, the current being cut off at the proper instant when its pulling power has reached the maximum. The best results obtained from an apparatus of this kind should be in its trial on a small scale, as this plan of applying the energy of the electric current is far less efficient than that employed in the ordinary electric motor. The speed obtained on the exhibition track, 50 ft. long, was 20 ft. per second, or about 15 miles per hour. It was stated that a much higher speed was possible on a longer track. Prof. A. E. Dolbear, of Tufts College, who was present, predicted a great future for the invention, which, although intended for the transportation of the mails and light packages only, he believed would be utilized for passenger traffic as well. While there is no question as to the possibility of operating a system on this plan, which is the invention of Mr. John T. Williams, there is very serious doubt as to its practicability on an extended scale, subject to the action of the elements, and to its economy and speed in comparison with the ordinary steam or electric railroad. If there be any merit in it there are plenty of electric companies who will be glad to secure exclusive rights, and they may be depended upon to investigate it thoroughly.

A New Insulator.

A recent German patent for a new insulating material for electric conductors specifies the use of paper which has been thoroughly soaked in an ammoniacal copper solution. The pasty mass is then pressed against the conducting wires to be covered by means of rollers, and the whole is finally submitted to strong pressure. When dry the covered wire is passed through a bath of boiling linseed oil, being left in it until the covering is saturated. This makes it elastic and impermeable to moisture. The covering is said to be durable and eminently efficient as a non-conductor.

The Transatlantic Steamer "Augusta Victoria."

The Hamburg American Packet Co.'s new twin-screw steamer "Augusta Victoria" appeared off Sandy Hook shortly after 6 p. m. on Saturday, May 18, and arrived at her dock on Sunday noon. The steamer made the trip from Southampton to Sandy Hook in seven days, two hours and thirty minutes, actual time, but if the difference of the distance between Fastnet and Southampton be allowed for, her time from Fastnet to Sandy Hook would be six days, eight hours and thirty minutes, said to be the fastest first trip ever made.

The new steamer has triple expansion engines. She is not as large as the "City of Paris," being fully 100 ft. shorter in length and 7 ft. less beam. Although she is so much smaller than the "City of Paris," she has propellers 19¾ ft in diameter, those of the former ship being 18 ft. Her average speed on this trip was 17.9 knots per hour. That of the "City of Paris" on her last trip was 19.95 knots. She is elegantly furnished throughout and has five decks. Her general dimensions are: Length, 460 ft.; breadth, 56 ft.; depth, 38 ft., and displacement 10,000 tons. A power of 12,500 horse-power it is stated can be developed. The steamer was built at Stettin, Germany.

The Bicycle Railroad.

The Boynton Bicycle Railroad Co., which has had built at the shops of the Portland Co., at Portland, Me., two locomotives for running upon a single rail, has ordered of the Ellis Car Co., of Amesbury, Mass., five cars to be built upon the same principle, and will before long have an exhibition track completed at Coney Island, N. Y. A mile and a half of unused track belonging to the Seabeach & Brighton Railroad has been secured, and will be equipped with the overhead rail.

Corrosion of Zinc in Contact With Brick Masonry.

Recent experience in Germany points to the fact that under some conditions sheet zinc, when in direct contact with brickwork, suffers from rapid corrosion. It appears that in building the Berlin city market halls some sheet zinc work which rested upon brick walls was deeply pitted at a number of places, and particularly where the metal was in direct contact with the bricks. Chemical examination of these showed that they contained as high as 1.14 per cent. of soluble salts, capable of producing the destructive effects noted, and stimulated to more energetic action by moisture. Of course, the proportion of such salts will vary with different kinds of bricks, and in some there may be nothing to induce such corrosion as that here noted. On the whole, however, it would be an advisable and, in the end, a cheap precaution to avoid immediate contact of sheet zinc and brick-work by inserting a layer of roofing felt or other similar material.

THE SCRAP HEAP.

Notes.

Two or more conductors of the New York & New England have been arrested at Boston for selling tickets to a fish dealer of that city to be re-sold.

The Chicago & Grand Trunk will run weekly excursions in Pullman vestibule trains from Chicago to the White Mountains during the coming summer.

The Louisville & Nashville has discharged a large number of passenger conductors, as many as 15 being dismissed on one divison according to the published report.

The law of the state of New York prohibiting the placing of freight and baggage cars in a train behind passenger cars has been amended so as to apply to freight cars only.

The extensive docks and warehouse of the Chesapeake & Ohio in Norfolk, Va., were burned May 17. The origin of the fire is not known. The loss will probably amount to about $75,000, and is partly insured.

The two attempts to wreck the New York & Chicago limited, near Canton, Ohio, last month, proved to have been the work of two young men who had been discharged by a section master. They have been arrested and have confessed.

The annual meeting of the insurance company of Southern Pacific employés was held in San Francisco last week. The company has paid 9 death benefits, amounting to $9,000, during the past year, and has a surplus of $2,687, in addition to the regular reserve fund.

The Lake Shore & Michigan Southern shops have been busy for the past month in fitting vestibule cars with clamps for fastening the cars together at the top, this device being used in place of the springs which have been taken off in consequence of the decision in the patent suit of the Pullman against the Wagner Company.

The hospital of the Wabash Railway at Springfield, Ill., which is supported by contributions of employés, who pay one per cent. of their wages monthly, has, on an average, 25 patients in its wards. During the last calendar year 9,000 prescriptions were issued, and there were 800 surgical cases. The expenses of the institution are about $1,000 per month. There are four other hospitals on the lines of the system.

The fast mail train of the Chicago, Burlington & Quincy between Omaha and Chicago now carries passengers and connects with the new daily overland train of the Union and Southern Pacific. It seems that not all the roads between Chicago and Council Bluffs have accelerated the speed of their through trains, as was announced in connection with the change on the Union Pacific. We have seen no definite time-tables, but it is stated that a letter from San Francisco to New York and its answer, if mailed the same day the letter is received, now require but eleven days for the round trip, a gain of two whole days over the old time table.

Reduction of Iron Ore Rates.

The Western Freight Agents, at a meeting held at Pittsburgh, decided to reduce the rates on iron ore from lake ports to Pittsburgh from $1.25 to $1.05 per ton. The action was rendered necessary both by the decline in the price of iron and by the increasing competition of Cuban ore. The *Iron Trade Review*, quoting Mr. Graham, of Philadelphia, gives the cost of Cuban ore (which so far has yielded from 62 to 66 per cent. of metallic iron 0.006 to 0.026 per cent. of phosphorus and 0.02 to 0.04 per cent. of sulphur) laid down at New York, Philadelphia or Baltimore as below:

Mining	$0.75
Royalty	0.30
Transportation	0.15
Ocean freights	1.75
Duty	0.75
Administration and incidentals	0.50
	$4.20

The present cost of Lake Superior Bessemer ore in Pittsburgh is about $6.75, and in the Schuylkill Valley it is from $7.25 to $8.25 per ton.

Responsibility of a Sub-Contractor.

A case of considerable interest was decided in the County Court at St. Albans, Vt., May 15. The Berlin Bridge Co. contracted to build a bridge over the river at Shelton, and they in turn contracted with the Vermont Construction Co. to build the abutments and piers. Subsequently, the bridge was carried away by high water and ice, and the bridge company brought suit to recover from the Vermont Construction Co., alleging defective workmanship by the latter in connection with the bridge masonry. The jury brought in a verdict for the plaintiff for the sum of $5,875.

The London & Northwestern.

The *Station Agent*, published at Cleveland, O., publishes an article on the London & Northwestern from the pen of the General Manager of that road, Mr. Findlay. We extract from it some facts concerning the methods in vogue there, together with a few statistics. Says Mr. Findlay:

The London & Northwestern is divided into ten districts. The District Superintendent has under him an Assistant and several Travelling Inspectors, who regularly visit every station and signal post, and investigate and report upon everything that is going on in the district. They are encouraged to make suggestions for the improved working of the trains and the avoidance of irregularities, and the suggestions they make are always carefully considered. The passenger traffic is in the main confined to the daytime, and the operations connected with the goods traffic have for the most part to be conducted during the night. We are lighting all our shunting yards and groups of marshalling sidings with large and powerful lamps of the Siemens type, and this tends very much to facilitate the work and avoid mishaps. We have not yet found it practicable to make any general use of electric lighting for our shunting yards and stations, although that may come in the future. * * The most scrupulous attention is paid to the training of signal men, and they are never intrusted with the sole charge of signals until they have had a specific course of instruction and their appointments are not confirmed until the superintendent of the division has certified that he has examined the men and finds them in every respect qualified. For the superior positions of inspectors, foremen, station-masters, and the higher grades of the service, it is the invariable rule to select men from the lower ranks solely on the ground of merit, the best man for a particular post being chosen, irrespective of seniority or any other circumstance. Engine-drivers usually commence service as lads in the engine houses. Three societies have been established, called the 'Insurance Fund" (Accidents), the "Provident Fund" (Sickness), and the "Pension Fund," by means of which the men are effectually provided for in the event of their being overtaken by accident, ordinary sickness or old age. The men contribute a few pence a week out of their wages toward these funds, and the company contributes largely, and some of their officers assist in the management; but, in the main, the funds are controlled and administered by an elective committee of the men themselves. The members of these societies comprise the entire wages staff of the company, with the exception of the men engaged in the locomotive department, who have kindred societies of their own, organized and managed in very much the same way, the company contributing substantially to the funds.

The total number of the staff employed by the London & Northwestern is 55,217, of which about 8,000 are actually engaged in connection with the running of the trains.

The company's freight stations in London employ 2,700 men and 640 horses in delivering and collecting freight, and the company's agents, Pickford & Co., employ about as many more.

Long Mileage Without Repairs.

A newspaper item says: "The Poughkeepsie (N. Y.) horse railroad company has just disposed of a horse that has traveled 54,000 miles on the road in that city, having been in the service of the company 10 years. During all that time it has been sick but four days. The animal was still in good condition." This would be about 15 miles a day.

Wreck of the Steamer "Alaskan."

The Oregon Railway & Navigation Co.'s steamer "Alaskan" foundered at sea off Cape Blanco on May 13, while on her way from Portland to San Francisco, where she was to be refitted. She encountered a hurricane on Monday, and, her upper decks lifting, she foundered very quickly Captain Howes and ten men were picked up, two of whom died from injuries sustained. Thirty men are unaccounted for, and have been given up as lost. There were no passengers. This boat was one of two built by John Roach, and sent around the Horn for service in Puget Sound. The "Alaskan" had been laid up for some time.

Faifer's Way-bill File.

The Faifer Way-bill File Co., of Denver, Col., has lately introduced an improved file or binder for holding large sheets such as way bills. These files are made in three sizes, the smallest being 14 × 19 in., and with 2½, 3½ and 4½ in. backs, with capacity for 1,000, 2,000 and 3,000 tissue sheets, respectively. While these files are made in a specially strong and substantial manner, their distinctive merit consists in the four binder's hinges at the back instead of two, thus greatly facilitating the handling of the book for reference, while at the same time affording a stiff instead of a flexible back. The flexible braided wires which run through the perforations in the left hand side of the way-bills to be filed are fastened in a very strong metal bar and have a stiff and sharp point, which renders the labor of filing very easy.

This file is highly recommended by the Denver & Rio Grande and other roads that have used it, and is said to have been adopted by all roads that have tried it. It is furnished to railroads in quantities of 100 or more at $1.25 each.

Continuous Brakes in France.

The French Chamber of Deputies has lately discussed a law relating to public safety on railroads, and of course touched upon continuous brakes. It appears that the debates on the subject were not very unlike those which take place in our own legislative bodies. We quote the following remarks interchanged about continuous brakes between Mr. Gay, Government Commissioner, and his opponents:

Mr. GAY (Government Commissioner): If we are to require the application of continuous brakes to all trains, passenger and mixed, all the cars must be equipped.

Mr. DELATTRE: Not at all. The apparatus can be carried under the cars which are not equipped.

Mr. GAY: This invention has not yet been tested, and until that time the government requests the Chamber not to expose travelers to experiments of this kind. ("Good, good," on the right.)

Mr. DELATTRE: But that which we demand is used in Turkey.

Mr. GAY: I have not the honor of managing Turkish railroads, and I know nothing about their plant.

Mr. DELATTRE: There are not so many accidents in Turkey as in France.

Mr. GAY: There were still less in the time of the oxen of the Merovingian kings. (Laughter.) I repeat that it will be necessary to equip freight cars used in mixed trains with a continuous brake, and since it is impossible to specify the cars intended for mixed trains and those making part of freight trains exclusively, it will be necessary to provide all freight cars with continuous brakes. Now the cost of this change is $190 per car, as determined by the Technical Committee on Railroads, which is composed of the most experienced and scientific men.

Mr. FARCY: Too scientific to do anything practical.

Mr. GAY: It comprises, on the contrary, the most practical men, engineers of construction and operation; it comprises also several senators, who have proved their talent and ability during their engineering career.

Mr. DELATTRE: Oh, senators, indeed!

Mr. GAY: They were deputies when they were appointed members of the Technical Committee.

Upon this discussion the French editor remarks:

Here is so-called wit very much out of place, and travelers might be its victims at any moment if the railroad companies were influenced by the same considerations as affect the Government Commissioner. Fortunately this is not the case, for the question of continuous brakes is at this very time the subject of thorough trials, at least by the Paris-Lyons Co.

The Coal Industry in Turkey.

More than 300,000 tons of coal, costing about $1,500,000, is imported from England to Constantinople every year, and yet at a short distance from that city there are coal deposits which are among the largest and richest in the world. These mines were first worked by the English during the Crimean war, the coal being delivered to the allied fleet. Railroads and the necessary plant were introduced at this period, but the mines were only worked on the surface. After the war, when the English engineers departed, the mines of Heraclea were nearly forgotten. They were worked to some extent by ignorant natives, but the coal was not properly prepared, and the industry did not prosper. Up to 1882 the proprietors of these mines were forced to sell all their coal to the Turkish government at a fixed price, but at the end of this year an imperial decree was issued allowing the miners to sell or export 40 per cent. of their product, reserving 60 per cent. for the needs of the government. Since that time the coal industry has continually increased in prosperity and presents a brilliant future, most of the coal strata being rich and of good quality, having a thickness of from 5 to 10 ft., and some of them being superior to the best English coal beds.

A New Kind of Glue.

In Norway a new use for whale oil has recently been discovered. Messrs. Bull and Hofsten have succeeded in extracting a glue which is highly recommended, having a superior adhesive force, drying quickly, and being free from unpleasant odor.

Railroads in Venezuela.

The French Company of Venezuela Railroads is the grantee of the line from Merida to the Lake of Maracaybo. It has also the exclusive privilege for 12 years of establishing a line of steamers between the terminus of the road, San Carlos, on the river Escalante, and the different lake ports,

which gives communication as far as the city of Maracaybo. The Government of Venezuela guarantees the company the interest of 5 per cent. on the cost of construction, based on the estimate of $7,000 per mile for the first section, and $8,000 for the second, from the time of opening the road to traffic. Moreover, the state gives land for 2,000 ft. on each side of the road.

Criticism in the Breezy West.

This is May 12, and the new and very inconvenient time tables on the Pacific and Utah Central roads go into effect. The fault lies with Uncle Kimball, and many a traveler who is routed out of bed at 5 a. m. to day will wreath the good old man's name with vocal garlands of the purest sulphur. *Exchange.*

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Illinois the Federal Court rules that while a lease of cars by the receiver of a railroad is valid until disaffirmed by the court, it is not such "an instrument in writing" as entitles the lessor to interest on the rent due under the state statute.[1]

An Illinois statute provided that a county might issue bonds in aid of a railroad upon the vote of a majority of the legal voters, and prescribed the conditions upon which they should be made, and that such bonds should not be valid until such conditions should have been complied with. A county, in September, 1869, voted to issue bonds on condition that the road should be begun and completed in the county within specified periods. These periods were extended by the county court and board of supervisors, but not until after the adoption of Const. Ill. 1870, which prohibited such subscriptions in aid of railroads, except where they were authorized by vote prior to its adoption. The Supreme Court of the United States decides that the road not having been completed within the time prescribed by the original vote, the bonds were invalid in the hands of *bona fide* purchasers, especially when issued and purchased after a decision by the Supreme Court of the state holding similar bonds void.[2]

The Supreme Court of New York rules that the statutes authorizing the consolidation of railroad companies, and providing that all debts and liabilities of either company, except mortgages, shall attach to the new corporation, and be enforced against it and its property to the same extent as if created by it, allow an action against the new company, on bonds and coupons of one of the former companies, though they are secured by a mortgage on the property of the original debtor corporation.[3]

In Michigan the Supreme Court rules that a director of a railroad company who at its request renders services as attorney, and in procuring aid notes, right of way, and in enlisting capitalists in the enterprise, is entitled to recover the reasonable value of such services.[4]

The Court of Appeals of Kentucky holds that a provision of a city charter that the council shall have "exclusive control of the streets, sidewalks, lanes, alleys, market places and other public grounds within the corporate limits, and shall cause the same to be kept clean and in repair," does not confer upon the council power to grant to a railroad the right of way over and along its public streets, as that would be an appropriation or use of the streets for a purpose not contemplated when the charter was granted. And though the Legislature may authorize the construction and operation of a railroad through a city or town, and upon its streets, even without the consent of the municipality, a provision in the company's charter authorizing it to construct its road from any point on its road to the cities named, and from any point on its road to a certain other road, does not confer upon it such authority.[5]

In Massachusetts the Supreme Judicial Court holds that where mail carriers unnecessarily obstruct the platform of a railway station, causing injury to one who recovers therefor in an action against the railroad company, the latter is not a joint wrong-doer in such a sense as to prevent a recovery from the mail carriers of the amount paid on the judgment.[6]

Carriage of Goods and Injuries to Property.

The Supreme Judicial Court of Massachusetts decides that under a special contract to deliver a car-load of apples to a connecting line within a given time, so as to avoid the danger of cold weather, the first carrier is liable for damage to the apples by freezing, while being transported over the connecting line, caused by the former's delay in delivering them.[7]

In Nebraska the M. P. Ry. Co. received a piano at W., to be carried to L., and delivered to a connecting common carrier for transportation to P. At L. the track of the M. P. Ry. crossed the track of the B. & M. R. Co., the tracks and stations being connected by a Y. The piano was carried to L. by the M. P. Ry., and delivered to two draymen, to be transferred to the B. & M. R. Co. at its station. Before delivery to the last-named railroad company, and while in possession of the drayman it fell out of the wagon, and was broken, and was not received by the agent of the B. & M. R. Co.

The Supreme Court holds the M. P. R. Co. liable.[8]

The Dakota code provides that the obligations of a common carrier may be limited by special contract. Another section provides that a consignor or consignee, by accepting a bill of lading or written contract of carriage, with a knowledge of its terms, assents to the rate of hire, and the time, place, and manner of delivery therein stated: but that his assent to any other modification of the carrier's obligations contained in such instrument can only be manifested by his signature to the same. The Supreme Court rules that a condition in a receipt given to plaintiff by the express company, for property delivered to it for shipment, to the effect that the company would not be liable for any loss or damage unless claim therefor was presented within a certain time from the date of the receipt, was not binding on the plaintiff, the latter not having signed the receipt.[9]

In New York the Supreme Court rules that an interruption of light, air and access to property, caused by building a stairway in front of plaintiff's property by an elevated railroad company, to enable passengers to ascend to its road, plaintiff has a sufficient remedy at law, and an injunction will not issue.[10]

In Indiana the Supreme Court holds that where a railroad had engaged to place a cattle-guard upon plaintiff's premises, he may maintain an action for the value of cattle killed by reason of the failure of a company to maintain such cattle-guard.[11]

In Ohio the Supreme Court holds that where the owner of land grants a right of way through it to a railroad company and agrees in writing to fence the railroad on each side, such agreement not being upon record is no notice to a subsequent purchaser of the land, and he can require the railroad company to fence its track according to the laws of the State.[12]

The Supreme Court of Minnesota rules that no action lies against a railroad for the inconveniences necessarily caused to premises in the vicinity by noises, smoke, jarring of the ground, etc., arising from properly and prudently operating its railroad upon its own land, or upon land in which the party complaining has no interest.[13]

In Dakota a heifer was killed by a train. The animal was first discovered by the engineer in a narrow cut a short distance around a curve. The train, composed of 15 loaded freight cars, was running at the rate of from 12 to 15 miles an hour on a down grade. As soon as the animal was seen, the engineer applied the brakes, and gave the usual signals for stopping. The whistle was also blown repeatedly for the purpose of frightening the animal from the track; nor did it appear that the train could, by the exercise of any degree of care or skill, under the conditions then existing, have been stopped before striking the animal. The Supreme Court rules that the railroad is not liable.[14]

Injuries to Passengers, Employes, and Strangers.

In Alabama the Supreme Court rules that an instruction that unless defendant's servants "in charge of its train did all in their power which they could reasonably do to avoid the killing, it is liable," is erroneous, as they are not required to do anything when they cannot avert the injury.[15]

In Kentucky a drunken passenger on a train entered the ladies' car, and by violence and indecent language alarmed the passengers, and, when locked out of the car, pulled the bell-rope, stopping the train, and threatened the conductor with an open knife. He was ejected two miles from the nearest station, and two hundred yards from a farm-house, it being a warm night, and not very dark; and was killed by a later train going in the opposite direction. No negligence by those in charge of the later train was shown. The Court of Appeals holds that the company is not liable.[16]

In Massachusetts, a passenger, there being no seats in the car in which he was, went on the platform of another car, and was looking through the window for a seat, when he was injured by a collision caused by the negligence of the railroad servants. The Supreme Judicial Court rule that the railroad is liable.[17]

In Massachusetts the deceased, in the discharge of his duties as defendant's employé, had occasion to cross defendant's railroad track at night, when the darkness was increased by the smoke of moving trains. He waited until, as he supposed, the last car of a passing train had gone by, and then started across the track, where he was run over and killed by a car which had become detached from the train, owing to the spreading of a coupling link, and was moving rapidly and silently, without signals, and with no one in charge. Plaintiff offered no evidence as to how the link happened to spread, as to whose carelessness, if any one's, it was due, nor as to knowledge of the defect on part of defendant. The Supreme Judicial Court holds the railroad liable.[18]

In Georgia in an action by a train-band for injuries alleged to have resulted from the negligence of the conductor, in ordering the train to leave the station before plaintiff had time to perform a duty assigned him, the evidence for plaintiff showed that he was ordered to carry one end of the bell rope over the tops of the cars to the engine; that the night was cold and dark, and the cars covered with ice; that plaintiff thought he could reach the engine before the speed of the train was great; that the cord caught something, delaying plaintiff, and, the speed increasing, he was thrown off and injured. The Supreme Court hold that the accident was an incident of the dangers of the service, and plaintiff could not recover.[19]

In New York the Court of Appeals rules that where a switchman had for a long time been employed in a railroad yard, and knew the shape and purpose of a frog, and knew that it was unblocked, it was error to submit to the jury as a question of fact, whether he was charged with notice of the difficulty of removing his foot from the converging rails, and of the danger resulting from having his foot caught therein.[20]

In Maryland the defendant's pay car, which plaintiff had entered for the purpose of receiving a sum due him, was started immediately after payment, and, while it was moving at the rate of 4½ to 5 miles an hour, he alighted, and was injured. The Court of Appeals holds that the questions of negligence and of contributory negligence, in an action for the injuries, were for the jury; and it was proper to refuse to charge that, if the train was moving at the rate of 5 miles an hour, plaintiff's act of alighting was negligence.[21]

In Texas, the plaintiff, a fireman and watchman, was requested by the engineer, who had been taken sick, to run the engine to a place where piles were to be driven. Plaintiff did so, and was injured by the explosion of a boiler of an engine used to operate the pile-driving machine. Plaintiff was not actually engaged in any work at the time of the accident, and there was a rule of the company forbidding an engineer to place his engine in the control of another; but there was testimony that this rule was not intended to be enforced in the case of the sickness of the engineer. The Supreme Court holds that plaintiff could recover for injuries received.[22]

In New York the Supreme Court rules that where a brakeman on a freight train was injured in attempting to set a brake, which than proved effective, evidence that after the accident the pin which held the brake-rod in place was missing, the train at the time having proceeded 30 miles on its journey, is insufficient to render the company liable.[23]

In the same state the Supreme Court holds that where defects in the internal construction of an emery-wheel are not apparent or visible, and are unknown to one who attempts to operate it, he does not assume the risks and perils arising from such defects.[24]

In New York a locomotive which had helped a west-bound freight was run upon the main track a little east of the station and left, while the engineer went to the station for orders, fronting to the west, with a light on its rear, but with no headlight, that having been broken the previous day. An east-bound freight collided with it, and the fireman of the east-bound freight was killed. The engine was on the track in violation of a rule of the company that no irregular engine should be allowed on the main track without special orders, and the approaching train was passing the station at a higher rate of speed than the company's rules permitted. The Supreme Court rules that the company was not liable unless the accident would not have happened but for the absence of the headlight.[25]

In Indiana the Supreme Court holds that where a defect in the machinery used for coupling was unknown to deceased, and was not obvious, and could have been discovered only by stooping down and looking under the car, deceased was not guilty of contributory negligence in going in between the cars to uncouple them.[26]

In Texas plaintiff and his wife were keeping a boarding-car in connection with a construction train, and just as the car was about to be moved, she was standing with the conductor near the door, to see where it would be placed. The car started with a jerk and she was thrown upon the track. The Supreme Court holds the railroad liable.[27]

In Kentucky, while a train was running on a down grade, and in the country, at a considerable distance from any road crossing, it broke in two, by some accident, and the engineer, to avoid a collision between the two sections of the train, increased his speed, making a considerable gap between them. An old lady went upon the track between the two sections and was killed by the rear one. The brakemen upon the rear of the train testified that he saw her "standing on the left of the track;" but there was no evidence that any person connected with the train knew she was on the track, or in any peril. The Court of Appeals hold that the railroad was not in fault and is not liable.[28]

In Michigan a man, while attempting to cross a railroad track in a village, was struck by an engine running at a high rate of speed. There was, in addition to the main track upon which the engine was running, a side track, filled with box cars, leaving only 30 or 32 ft. of the street which was 80 ft wide, open. There were also buildings, which were alleged to have obstructed the view of the approaching engine. The Supreme Court reverses a verdict in favor of the railroad.[29]

In the same state in an action to recover the value of a horse and carriage destroyed by a collision with an engine on defendant's track at a street crossing, the evidence showed that a person standing in the centre of the street at a point 40 ft. west from the track could see the top of a locomotive 179 ft. north of the intersection of the track with the street, while west of said point the view of the track to the north was obstructed by a high bank. To the south from the street there was a steep up-grade, so that a train of loaded cars must, in order to ascend the same, cross the street at a high rate of speed. The engineer on a train coming from the north could not get his eye into the street west of the track until the locomotive was within 60 or 75 ft. from the crossing, and then his vision would only extend 40 or 50 ft. west of the track. The Supreme Court rules that it was the duty of the railroad to station a flag-man at the crossing, though the railroad commissioners, on whom the duty of determining the necessity for flag-men had been imposed by statute, had not ordered a flag-man stationed there. But, it appearing that plaintiff was driving at an easy trot, and could have seen the engine after reaching the point 40 ft. west of the crossing so as to have stopped and avoided the accident, and that he was thoroughly familiar with the locality, he was guilty of such contributory negligence as would prevent his recovery.[30]

In the same state the Supreme Court rules that evidence that a gate across an avenue which defendant's railroad track crossed diagonally, which was shut when trains were crossing, was raised by defendant's flagman; that no signal was given from the approaching train, as required by statute; that the view of the train was obstructed, and that the flagman did nothing except swing a safety signal, will sustain a verdict for negligently killing a pedestrian.[31]

A Missouri statute provides that "whenever any person shall die from any injury resulting from or occasioned by the negligence * * * of any servant or employé," while running a train of cars, his representatives may recover $5,000 damages, provided the person would have had a cause of action had death not resulted. A subsequent clause provides for damages when any passenger shall be injured by any defect or insufficiency in machinery, etc. The Supreme Court rules that the first clause is not limited to passengers, but also includes the case of an employé whose death is not occasioned by a fellow-servant.[32]

In Tennessee the Supreme Court decides that where the regulations of a railroad provide that, in case a train becomes divided, the front brakeman shall go to the rear of the front portion and signal the engineer which way to move, etc., and that the engineer shall obey the signals, and also that, in case the conductor is cut off from the train, the right to command shall devolve on the engineer, the engineer and brakeman are only fellow-servants, in case of the breaking of a train, when the engineer does not assume the command, and both are acting in the line of their separate duties.[33]

In Texas, a railroad was sued for malicious prosecution. The alleged malicious prosecution was for perjury in testifying that a passenger coach of defendant corporation had a loose wheel before it was wrecked. There was evidence that soon after the accident a telegram between defendant's agents contained the words "loose wheel;" that its general manager said, "Of course, we understand it, but the world does not;" and the general manager had heard that in a previous proceeding another witness had testified that the wreck was caused by a loose wheel. The Supreme Court affirm a verdict of eight thousand dollars against the company.[34]

In Columbus the Supreme Court holds that in an action against a railroad for injuries to a fireman by the derailment of a locomotive, caused by an obstruction on the track, evidence, that for several days fires had prevailed for miles along the mountain side, causing stones and logs to roll down upon the track, which was immediately below; that the company had knowledge of these facts; and that there were no track-walkers before midnight,—shows negligence on the part of the railroad.[35]

The Supreme Court of Texas rules that a foreman of a bridge gang and employés operating a train on the road are "fellow-servants."[36]

In Dakota an employé was killed under the following circumstances: A flying switch was being made. Part of the train was being run upon a side track, and the rest, in two sections, some distance apart, down the main track. Deceased attempted to cross the main track with the rear section of the train—the one which ran upon him—in full view, and not more than 25 or 30 ft. from him. He crossed the track diagonally, with his back turned partly toward the rear section of the train. It appeared that the track in either direction from the place of the accident was straight, and the view unobstructed. The Supreme Court holds that he was negligent and the company is not liable.[37]

The Supreme Court of Texas decides that one employed as conductor by a railroad operating as lessee, without authority of statute, a railroad belonging to another corporation, cannot recover of the latter corporation for injuries sustained on account of a defect in an engine owned and controlled by the lessee.[38]

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1 Thomas v. P. & R. I. R. Co., 36 Fed. Rep., 808.
2 German Sav. Bk. v. Franklin Co., 9 S. C. Rep., 159.
3 Polhemus v. Fitchburg R. Co., 3 N. Y. (Supp), 327.
4 Ten Eyck v. P. O. & P. A. R. Co., 41 N. W. Rep., 905.
5 Ruttles v. Covington, 10 S. W. Rep., 644.
6 Old Colony R. Co. v. Slavens, 19 N. E. Rep., 372.
7 Fox v. B. & M. R. Co., 19 N. E. Rep., 222.
8 Mo. Pac. R. Co. v. Young, 41 N. W. Rep., 646.
9 Hartwell vs. N. P. Ex. Co., 41 N. W. Rep., 732.
10 Klone v. K. C. El. Co., 3 N. Y. (Supp.), 149.
11 Chicago, etc., R. Co., v. Barnes, 18 N. E. Rep., 459.
12 P. R. Co. v. Bosworth, 18 N. E. Rep., 533.
13 Carroll v. Wis. Cen. R. Co., 41 N. W. Rep., 661.
14 Jay v. F. E. & M. V. R. Co., 41 N. W. Rep., 757.
15 Nash., C. & St. L. R. Co. v. Hemtree, 5 South Rep., 173.
16 L. & N. R. Co. v. Logan, 11 S. W. Rep., 655.
17 Denbie v. B. &. M. R. Co., 19 N. E. Rep., 523.
18 Griffen v. B. & A. R. Co., 19 N. E. Rep., 106.
19 Cent. R. Co. v. Smith, 8 S. E. Rep., 311.
20 Appel. v. B., N. Y. & P. R. Co., 19 N. E., 93.
21 N. Y., P. & N. R. C. v. Coulson, 16 Atl. Rep., 208.
22 East Line & R. R. R. Co. v. Scott, 10 S. W. Rep., 298.
23 Bailey v. R. W. & O. R. Co., 3 N.Y. (Supp.), 585.
24 Mentaugh v. N. Y. Cent. & H. R. Co., 3 N. Y. (Supp.), 483.
25 Whittaker v. D. & H. Canal Co., 3 N. Y. (Supp.), 576.
26 L., N., A. & C. R. Co. v. Buck, 19 N. E. Rep., 453.
27 Brown v. Sullivan, 10 S. W. Rep., 288.
28 John v. L. & N. R. Co., 10 S. W. Rep., 417.
29 Close v. L., S. & M. S. R. Co. 41 N. W. Rep., 828.
30 Freeman v. D., S. S. & A. R. Co., 41 N. W. Rep., 872.
31 Fitzgerald v. Long Island R. Co., 3 N. Y. (Supp.), 230.
32 Sullivan v. Mo. Pac., R. Co., 10 S. M. Rep., 852.
33 L. & N. R. Co. v. Martin, 10 S. W. Rep., 772.
34 Gulf, C. & S. F. R. Co. v. James, 10 S. W. Rep., 744.
35 D., S. P. & P. R. Co. v. Wilson, 20 Pac. Rep., 340.
36 St. L., A. & T. R. Co. v. Welch, 10 S. W. Rep., 529.
37 Elliot v. C., M. & St. P. R. Co., 41 N. W. Rep., 758.
38 East Line, R. R. R. Co. v. Culbertson, 10 S. W. Rep., 706

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Charlotte, Columbia & Augusta, quarterly, 1 per cent., payable June 1.

Cincinnati, Indianapolis, St. Louis & Chicago, quarterly, 1¼ per cent., payable June 15.

North Pennsylvania, quarterly, 2 per cent, payable May 25.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston, Concord & Montreal, annual meeting, Plymouth, N. H., May 27.

Burlington, Cedar Rapids & Northern, annual meeting, Cedar Rapids, Iowa, May 28.

Canada Southern, annual meeting, June 5.

Chicago & Eastern Illinois, annual meeting, Chicago, Ill., June 5.

Chicago, Kansas & Nebraska, annual meeting, Topeka, Kan., June 12.

Chicago & Northwestern, annual meeting, Chicago, Ill. June 6.

Chicago, St. Paul, Minneapolis & Omaha, annual meeting, Hudson, Wis., June 8.

Des Moines & Fort Dodge, annual meeting, Des Moines, Iowa, June 6.

Galveston & Western, annual meeting, Galveston, Tex., June 1.

Middletown, Unionville & Water Gap, annual meeting, 15 Cortlandt street, New York, May 27.

Northern, Concord, N. H., May 30.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Railway Master Mechanics' Association* will hold its next annual convention at Niagara Falls, beginning Tuesday, June 18, with headquarters at the International Hotel. All who wish to secure rooms should apply to Mr. A. H. Gluck, Manager, International Hotel, Niagara Falls, N. Y.

The *Master Car-Builders' Association* will hold its next annual convention at Saratoga Springs, N. Y., June 25. Hotel accommodations may be secured by applying to H. S. Clement, Manager Congress Hall.

The *Train Dispatchers' Association* will hold its second annual convention in Indianapolis, Ind., June 12. E. J. Peabody, 237 Franklin street, Chicago, is Secretary.

The Association of American Railway Accounting Officers will hold its next meeting at Niagara Falls, N. Y., July 10.

The International Association of Car Accountants will hold its fourteenth annual meeting at Plank's Grand Hotel, Island of Mackinaw, Mich., June 25.

The Traveling Passenger Agents' Association will hold its next meeting in Plank's Hotel, Mackinac Island, Mich., July 9.

The Roadmasters' Association of America will hold its seventh annual convention at Denver, Colo., Sept. 10.

The New England Roadmasters' Association will hold its next meeting in Boston, August 21.

The American Association of General Passenger and Ticket Agents will hold its next semi-annual meeting in Atlanta, Ga., Sept. 17.

The National Association of General Baggage Agents will hold its next meeting at Detroit, Mich., July 17.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month, except June, July and August. The next meeting will be held Sept. 11.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month. The club will give a banquet at Delmonico's, May 23.

The Central Railway Club meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Gerard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7.30 p. m. at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7.30 p. m. on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

Engineers' Club of St. Louis.

The 308th meeting of the club was held May 15, President Meier in the chair, 43 members and 6 visitors present. Messrs. T. J. Long and O. H. Schramm were elected members. President Meier read a memoir of the late Col. Henry C. Moore, ex-President. Mr. J. A. Seddon read a paper describing experiments on settling water in the basins of the St. Louis water works. Discussion of this paper was made the special order of the next meeting.

Prof. J. B. Johnson presented a paper on trussing the Fagin building against wind pressure. On the exposed east face of the building the wind pressure had reached 40,000 pounds, and this was supposed to have thrown it out of plumb. The paper described the method of righting the building and trussing it permanently. The trussing is calculated to withstand a wind pressure of 30 pounds per square foot. Messrs. Holman, Moore and Ed Flaid took part in the discussion. Colonel Meier explained a somewhat similar case at the Armory building.

Prof. Nipher made a valuable report on a recent investigation into the performance of an engine working at a fixed cut-off without governor. Measuring the braked horse power, steam pressure and speed, he finds that the performance of the engines is represented by an hyperbolic paraboloid in which the lines of constant load and constant speed are rectilinear elements. At any fixed pressure the relation between output and speed is represented by a paraboloid, the vertex of which represents the condition of maximum output.

Engineers' Club of Philadelphia.

A business meeting was held May 4, Vice-President Beardsley in the chair and 46 members present.

Mr. J. E. Codman presented a table of Dimensions of Pipe Flanges and Cast Iron Pipes, for the Reference Book.

The Secretary *pro tem.* presented, for Mr. Robert A. Cummings, a paper on Color, which the author treats, generally, as to contrast and as to harmony and qualities of colors. The paper is accompanied by a table, showing the relative value of blue prints of colors, which blue prints, etc., were exhibited with the paper.

Mr. Arthur Marichal called the attention of the club to a paper read before the Society of Civil Engineers of Paris by Mr. Decordemoy, in which he describes the recent improvements of the Harbor of Bilbao, Spain. Until these last years the harbor was protected by two parallel jetties 525 ft. apart. At the outlet of these jetties there was a bar preventing vessels of over 1,000 tons from entering the port. The engineer, Mr. De Churruca, proposed to build a single concave jetty. This was completed in 1888, when it was found that the channel was 11 ft. deeper than before. At this date vessels of 18 to 22 ft. draft can enter the port easily. There was some discussion by Prof. L. M. Haupt and others.

Prof. Lino F. Rondinella explained two diagram tables—one of which gives graphically the relations of lines and areas in polygons, and the other the relations between English and metric measurements.

Minneapolis Society of Civil Engineers.

A regular meeting was held May 8, Vice-President Sublette in the chair. A paper on the Panama Canal was read by Mr. W. W. Redfield. Mr. Cappelen was instructed to prepare some concrete specimens for investigation by the society.

PERSONAL.

—Mr. J. S. Patterson, Master Mechanic of the Cincinnati, Indianapolis St. Louis & Chicago, has resigned.

—Mr. Thomas Midelton, Locomotive Engineer, New South Wales Government Railways, resigned his position on April 1.

—Mr. J. T. Johnston, Superintendent of the Pittsburgh & Western, has tendered his resignation. He has held this position since 1883.

—W. H. Breithaupt, Baird Building, Kansas City, Mo., has been appointed Western representative of the Detroit Bridge and Iron Works.

—Mr. Wm. Jones, lately with the American Brake Co. in its New York office, has been elected Vice-President of the Standard Car Coupling Co. of New York.

—Mr. Edward Bates Dorsey is expected to arrive in London within a few weeks from South Africa, where he has been to examine and report upon various railroad systems.

—Mr. Theodore J. Butterfield, General Passenger Agent of the Rome, Watertown & Ogdensburg, was married May 14 at Portland, Me., to Clara Louise Deake, daughter of Charles S. Deake of that city.

—Mr. C. B. F. Palmer, formerly Secretary to the Superintendent of the White Mountain Division of the Boston & Lowell, has resigned to accept the position of Chief Clerk of the Inter-state Commerce Railway Association.

—Mr. C. G. Franklin has resigned his position as Contracting Agent of the St. Paul & Duluth to accept a position with the Northern Steamship Company. The duties of Contracting Agent will be assumed by General Agent W. M. Burke.

—Under the by-laws adopted by the Board of Directors of the Atchison, Topeka & Santa Fe, May 9, Mr. Joseph W. Reinhart as General Auditor becomes Chief of the Accounting Department, with office in Boston, reporting to the Chairman of the Board.

—The Central Traffic Association Freight Committee has declined to accept the resignation of its Chairman, J. T. R. McKay, but extended leave of absence to him until Sept 1. T. D. McCabe, of the Chicago, St. Louis & Pittsburgh, has been temporarily elected to his place.

—Mr. E. H. Utley, for a number of years General Freight Agent of the Allegheny Valley, has resigned to enter into the employ of Carnegie, Phipps & Co., Limited, of that city. He will take charge of the freight business of that firm, and also of Carnegie Bros. & Co., Limited.

—Mr. Charles C. Higham, who for several years past has had charge of the equipment of locomotives in the east with the driver and tender brakes of the American Brake Co. has been appointed General Superintendent of that company's works at St. Louis, vice Mr. George H. Poor, resigned.

—Mr. William Thow, Locomotive Engineer, South Australian Government Railways, has accepted a similar position on the New South Wales Railways. Mr. Thow has had considerable experience in Australia, and frequently contributes to the discussions of the American Master Mechanics' Association.

—Mr. William H. Bryan, Secretary and Librarian of the Engineers' Club of St. Louis, and for some years connected with the Pond Engineering Co., has taken a position with the Heisler Electric Light Co., of St. Louis. He has for some time made a specialty of the department of steam plants for electric service.

—Chief Engineer R. L. Harris, who was on the Naval Examining Board to test the steel cruiser "Charleston," but who became ill on the voyage from San Francisco and was incapacitated for duty, died at Santa Barbara, Cal., May 15. He entered the Navy in 1859 as Third Assistant Engineer, and became a Chief Engineer in 1871.

—Mr. George J. Forrest, President of the Wheeling & Lake Erie, Vice-President of the New York & Northern, and a Director in various other railroad and financial companies, died in New York, May 18, from failure of the heart. He was 79 years old. He was well known in Eastern financial circles, and his funeral was attended by many well-known railroad men.

—The employés of the Eastern Division of the New York, Chicago & St. Louis, to the number of 500, have presented to their former Superintendent, G. H. Kimoall, now Chief Engineer, of the Lake Shore & Michigan Southern, an address inscribed on parchment and bearing their signatures. It is handsomely bound, and is a gift that will be highly prized by the recipient.

—Mr. William Dulles, Jr., has resigned his position as Assistant Secretary and Assistant Treasurer of the Louisville, New Albany & Chicago, having held the office for over six years. Mr. Dulles has been elected Treasurer of the Presbyterian Board of Foreign Missions, with office in New York City, and will enter upon his duties early in June. Mr. John A. Hilton has been elected to succeed him on the Louisville, New Albany & Chicago.

—Mr. William S. Mellen, General Manager of the Wisconsin Central, was this week elected General Manager of the Northern Pacific. He is 43 years old, and has been General Manager of the Wisconsin Central since Oct. 1, 1886. He was previously Assistant General Superintendent of the same system. Mr. Mellen has been in the railroad service since December, 1865, and from that time until he became connected with the Wisconsin Central he remained with the Chicago & Northwestern, with the exception of a short period in 1881 when he was Assistant General Superintendent of the Atchison, Topeka & Santa Fe. The chief part of Mr. Mellen's career on the Chicago & Northwestern was in the freight department, he being General Freight Agent several years.

ELECTIONS AND APPOINTMENTS.

Allegheny Valley.—Charles S. McCargo has been appointed General Freight Agent, in place of E. H. Utley, resigned. James P. Anderson has been appointed General Ticket Agent, and will have charge of the Passenger Department. Both appointments will take effect June 1.

Ashuelot.—At the annual meeting of the company, held at Keene, N. H., May 14, A. B. Harris, J. Mulligan, W. H. Hale, N. A. Leonard and George E. Frink, of Springfield; Oscar Edwards, of Northampton; Elisha F. Lane, of Keene, were chosen directors; Elisha F. Lane, Clerk and Treasurer.

Baltimore & Ohio.—A. P. Bigelow has been appointed General Western Traffic Agent of the company, with office at Chicago.

Bellingham Bay Railway & Navigation Co.—At a meeting of the stockholders held on May 13, the following board of directors was elected: Eugene Canfield, Sutcliffe Baxter, John H. McGraw, William R. Forrest, Frank H. Richards, M. Muir Picken and Robert Canfield. The directors elected the following officers: Eugene Canfield, President; Sutcliffe Baxter, Vice-President; John H. McGraw, Treasurer, and William R. Forrest, Secretary.

Briarfield, Blockton & Birmingham.—The incorporators of this Alabama company are Cary A. Wilson, A. B. Shepard, S. M. Mullikin, P. D. Barker, T. C. Gillan, J. W. Whiting and T. G. Brush.

Canadian Pacific.—Robert Kerr has now immediate charge of the general freight and passenger traffic of all lines west of Port Arthur, with office at Winnipeg, and reports freight traffic to the General Traffic Manager and passenger business to the General Passenger Agent. D. F. Brown, as Assistant General Freight and Passenger Agent, with office at Vancouver, B. C., has immediate charge of the traffic of the Pacific Division.

Centralia & Chester.—Geo. H. Borneman has been appointed General Passenger and Freight Agent.

Chicago & Ohio River.—At the annual meeting held in Chicago, May 8, officers were elected as follows: President, Austin Corbin, New York; Vice-President, Albert M Farlin, Boston; Secretary and Treasurer, E. R. Reynolds, New York.

Chicago, Rock Island & Pacific.—J. H. Bedson has been appointed Master Mechanic in charge at Horton, Kan., vice J. H. Kirk, resigned.

Cincinnati, Hamilton & Dayton.—E. O. McCormick has been appointed General Passenger and Ticket Agent with headquarters at Cincinnati, O., in place of Charles H. Rockwell, resigned.

Cincinnati, Wabash & Michigan.—Volney C. Malott, Vice-President and General Manager of the Union Railway of Indianapolis, has been appointed Receiver by Judge Gresham.

Covington & Macon.—At the adjourned annual meeting in Macon, Ga., May 8, the following directors were elected: John E. Jones, of Macon; J. S. Baxter, of Macon; W. C. Lovette, of Macon; John C. Key, of Monticello; W. H. Ross, of Macon; A. Craig Palmer, of Macon; W. A. Broughton, of Macon, N. E. Harris, of Macon; R. K. Reeves, A. C. Talmadge and A. H. Hodgson, of Athens.

Decatur, Chesapeake & New Orleans.—The names and addresses of the officers of this company are: G. C. Sandusky, President, Shelbyville, Tenn.; G. W. Edwards, Vice-President and General Manager, Fayetteville; W. A. Frost, Secretary and Treasurer, Shelbyville, and C. H. Roser, Chief Engineer, Fayetteville.

Denver, Texas & Fort Worth.—At a recent meeting of the board of directors the following officers were elected for the ensuing year: President, Gen. G. M. Dodge; First Vice-President, John Evans; Second Vice-President, Morgan Jones; Secretary, Charles Wheeler; Treasurer and Assistant Secretary, J. T. Granger.

Eastern Railroad Association.—At the twenty-second annual meeting of the Eastern Railroad Association held in New York City, May 8, the following Executive Committee and officers were elected for the ensuing year: Executive Committee: William D. Bishop, New York, New Haven & Hartford; A. A. Folsom, Old Colony; James Moore, Central of New Jersey; J. N. DuBarry, Northern Central; Orland Smith, Baltimore & Ohio; Theodore N. Ely, Pennsylvania Company; Charles E. Pugh, Pennsylvania Railroad; H. F. Kenney, Philadelphia, Wilmington & Baltimore; J. M. Toucey, New York Central & Hudson River. Officers: President, Hon. William D. Bishop, Bridgeport, Conn.; Vice-president, Theodore N. Ely, Altoona, Pa.; Treasurer, Albert A. Folsom, Boston, Mass.; General Counsel, Andrew McCallum, Washington, D. C.; Secretary, John J. Harrower, Washington, D. C.

Jacksonville, Tampa & Key West.—James Colhoun has been appointed General Freight Agent, with office in Jacksonville, Fla.

Jeffersonville, Madison & Indianapolis.—The stockholders have elected the following directors: J. H. McCulloch, Will

iam Shaw, T. D. Messler, J. P. Green, W. H. Barnes, C. C. Taggart, Walter Irwin, James McCrea, J. L. Bradley, J. I. Irwin, T. M. Swope and N. F. Depauw.

Kansas City Belt.—The stockholders of the company have elected the following board of directors: George H. Nettleton, Wallace Pratt and Watson J. Ferry, of Kansas City; J. F. Goddard, of Chicago; Roswell Miller, of Milwaukee; A. A. Robinson and Edward Wilder, of Topeka. George H. Nettleton was elected President, Edward Wilder, Treasurer; Watson J. Ferry, Secretary; C. C. Ripley, Auditor and Cashier.

Kansas City Circle.—The company this week organized under the charter recently granted by the secretary of state of Kansas. The officers are: E. S. W. Drought, President; A. P. Fonda, Vice-President; N. McAlpine, Treasurer; J. Spencer, Secretary; W. B. Knight, General Manager and Chief Engineer.

Kansas City, Lawrence & Wichita.—Newman Erb, of Memphis, Tenn.; A. L. Applewhite, Kansas City, Kan.; C. F. Brotherton, Kansas City, Kan.; J. D. Bowersock and E. Summerfield, of Lawrence, Kan., are the incorporators of this Kansas company.

Kansas City & Southeastern.—The stockholders have elected the following directors: John I. Blair and John D. Vale, Blairstown, N. J.; D. C. Blair, Belvidere, N. J.; R. D. Blair, Clinton, Mo.; O. C. Ewart and James A. Blair, Kansas City. Officers were elected as follows: President, James A. Blair; Vice-President, D. C. Blair; Secretary O. C. Ewart; Treasurer, James A. Blair; Assistant Secretary, John D. Vale; General Manager, W. E. Gray.

Louisville, Evansville & St. Louis Consolidated.—The incorporators are David J. Mackey, William Hernlan, C. C. Baldwin, Bluford Wilson, G. A. Koerner, F. O. Hopkins, James Stillman, Thomas W. Scott, Edward H. Wangel.

Louisville & Nashville.—L. S. Fitzhugh, who has been Resident Engineer of the Birmingham Mineral, has been appointed to the same position with the Cumberland Valley branch at Pineville, Ky.

Robert H. Ingram, Auditor of the Ohio Valley road, has been appointed Assistant to Vice-President M. H. Smith, at Louisville, Ky.

Louisville, New Albany & Chicago.—John A. Hilton has been chosen Assistant Secretary and Assistant Treasurer, with office at 31 Nassau street, New York.

Nevada Pacific.—The directors of this Nevada company are: Charles Francis Adams, J. Gordon Dexter, of Boston; John Sharp, G. M. Cummin, James T. Little, Joseph A. Jennings and Le Grand Young, of Salt Lake.

New York & Northern.—The office of Train Master has been abolished and H. H. Vreeland has been appointed Superintendent, with office at High Bridge, N. Y. The Superintendent will assume the duties of Train Master and will have charge of maintenance of roadway, buildings, bridges and equipment. The Master Mechanic and Road Master will report to the Superintendent.

Northern Pacific.—At a meeting of the directors last week William S. Mellen was elected General Manager to relieve President Oakes of part of his duties.

Oneida, Oneonta & New York.—The directors of this New York company are: J. W. Warner, E. E. Coon, R. B. Downing, E. F. Haskell and Walter F. Randall, of Oneida; John Cross and Charles Munger, of Augusta; James Kenyon and John Ward, of Morris, and Burr Mattice, M. L. Keyes, W. A. E. Tompkins and Albert Morris, of Oneonta.

Paris, Choctaw & Little Rock.—At the annual meeting in Paris, Tex., May 14, the following officers were elected: S. J. Wright, President; D. K. Scott, Vice-President; B. J. Baldwin, Jr., Secretary, and L. P. Harrison, Treasurer.

Philadelphia, Wilmington & Baltimore.—At the annual meeting of the Delaware & Chesapeake held at Easton, Md., May 15, the following officers and directors were elected: President, G. B. Roberts; Secretary, Robert H. Groff; Treasurer, Robert W. Smith; Directors, G. B. Roberts, Hon. James B. Groome, Samuel Wetherill, Sr., David J. Cummins, Henry D. Welsh, J. N. DuBarry, John P. Green, George V. Massey and D. S. Newhall.

Pittsburgh, Youngstown & Ashtabula.—The annual meeting of the stockholders was held at Youngstown, O., May 16. The following directors were elected: John N. Hutchinson, George B. Roberts, J. N. McCullough, Thomas D. Messler, Philadelphia; William Mullins, William Thaw, Pittsburgh; J. G. Butler, Jr., Dr. Caleb H. Wick, W. Scott Bonnell, Youngstown; H. L. Morrison, Amos C. Fish, Ashtabula. The officers chosen are: J. N. Hutchinson, President; John E. Davidson, Treasurer; Frank Semple, Secretary.

Rogers & Summit.—The officers of this company are: William O. Wadley, President, Rogers, Ga., W. M. Stevens, Superintendent, Summit, Ga.; Jno. D. Overstreet, Chief Engineer, Summit.

Rutledge & Julian.—The company has organized with B. A. Walker as President, E. F. Dyer Treasurer and M. Walker Secretary. The office is at Rutledge, Ala.

St. Louis, Arkansas & Texas.—The appointment of Col. S. W. Fordyce as Receiver of the road has now been confirmed in the three states of Texas, Arkansas and Missouri. His bond has been filed, and possession has been taken of the whole property in his capacity as Receiver. He has reappointed the present officers.

W. D. Littlefield has been appointed Superintendent of Telegraph, with office in St. Louis, vice D. E. L. Cannon, resigned.

St. Louis & Birmingham.—The incorporators of this company are: Victor Macpherson, E. W. Linn, George R. Johnson, C. A. Ney and E. K. Campbell, of Birmingham and New York. V. Macpherson is Chief Engineer.

Sandusky, Columbus, Lake Erie & Southern.—At a meeting in Sandusky, O., last week, the following officers were elected: President, John McKelvey; Vice-President, Charles H. Jenkins; Treasurer, Edward H. Zurhorst. Charles A. Judson was chosen Civil Engineer and John J. McKelvey was selected as General Counsel.

South & North Alabama.—G. W. Craik has been elected Treasurer and Secretary.

Spokane & Rockford.—The incorporators of this company are: A. M. Cannon, E. J. Brickel, Charles J. Smith and Wm. K. Kennedy, all of Spokane Falls.

State Line & Denver.—The first board of directors is as follows: David C. Dodge, Theron Geddes, George B. Dodge, John F. Evans and John S. Kinkhead.

Sulphur Springs & Red River.—The incorporators of this Texas company are: George B. Bonner, Charles Stanbach, M. A. Lyman, Jasper N. Boyd, George B. Oliver, John T. Hargrove, J. A. Putnam, P. S. Foscue and C. B. Stephenson.

Texas & Pacific.—H. J. Stacy has been appointed Assistant Superintendent of Telegraph with office at Dallas, Tex.

Utah, Nevada & California.—The incorporators of this Utah company are: Francis Tiernan, Elmer S. Goodlander and William S. McWilliams, of Fort Scott; Richard I. Walker, August Debost and Charles D. Moore, of Topeka, and Joseph G. Jacobs, of St. Paul.

Utica & Adirondack.—The annual meeting of the company was held in Utica, N. Y., May 14, and the following board of directors elected: R. W. Sherman, M. B. De Long, E. Norris, H. C. Ballou, H. J. Cookinham, F. L. Jones, James F. Mann, Hon. J. S. Sherman, W. F. Baker, Utica; Michael McDonough, Troy; W. P. Dodge, Prospect; W. T. Finch, Northwood; H. C. Benedict, Grant.

Valley.—J. T. Odell has been appointed General Manager of the Valley Railroad Company, with headquarters at Baltimore, Md.

Wichita & Western.—J. F. H. McKibben has been appointed Local Auditor, Secretary and Treasurer of the Wichita & Western and the Kingman, Pratt & Western Companies, vice T. C. Wales, resigned. His office will be at Wichita, Kan.

OLD AND NEW ROADS.

Alabama Timber, Coal, Iron & Railroad Co.—The company expects to commence within two weeks the location of a line 15 miles long, extending into the body of long leaf pine region lying northeast of Jasper, Ala.

Alabama & Vicksburg.—The company has formally taken charge of the road of the Vicksburg & Meridian, and will hereafter operate it under the above title.

Anniston & Montgomery.—The preliminary survey between Anniston and Montgomery, Ala., 110 miles, has been completed. The Alabama Construction Co. has been organized to build the road, and has made a contract with the company.

Atlanta & Florida.—The proposition made by the Americus Investment Co., which controls the Savannah, Americus & Montgomery road, to the Georgia Improvement Co., which built the Atlanta & Florida road, has been formally accepted by the company. The Americus Investment Co. offered to purchase of the Georgia Improvement Co. 2,000 shares of the stock of that company at 50 cents on the dollar, payable in 12 months, without interest, and also to subscribe for 1,000 shares of said stock, payable in monthly installments, on condition that a reorganization of the Atlanta & Florida Railroad be effected at once, and that the Georgia Improvement Co. arrange to have its present indebtedness carried 12 months and also secure subscriptions to 1,000 shares of Georgia Improvement Co.'s stock, payable in the same manner as the subscription of the Americus Investment. An extension of the Atlanta & Florida is to be built at once from the present terminus at Fort Valley, Ga., south about 14 miles to Cordele, where it will connect with the Savannah, Americus & Montgomery.

Baltimore & Ohio.—At the meeting of the directors last week the statement of the earnings and expenses for last month was presented and shows a falling off in the earnings of $34,489 on the lines east of the Ohio River, an increase of $9,372 on those west, and a net decrease in the earnings on the entire system this month of $25,117. For the seven months of the present fiscal year there is a falling off in the net earnings on the entire system of $100,593. The report of the committee which has been investigating the affairs of the road for several months past was adopted. The committee appointed an expert accountant, who was given free access to the books, accounts and properties of the company, and was instructed to make a tour of inspection of all the lines, and ascertain the ownership and possession of all the properties shown by its books to belong to it and constituting part of its assets. All the lines south and west of Baltimore were visited—the Philadelphia division and Schuylkill River East Side railroads being visited at a later date—full memoranda being taken. A meeting of the investigating committee was held March 12 last, when the accountant submitted, for the information of the committee, 39 exhibits, covering the entire system of the Baltimore & Ohio in all its departments — physical, financial, accounting, etc. — many of which showing the financial condition of the company, the valuation by the committee of the surplus fund, and other matters appear at length, as stated by the committee in the last published annual report of the President and directors to the stockholders for the fiscal year ended Sept. 30, 1888. The several exhibits and reports embody a review of the road's financial and physical condition, and also furnish in connection with the 62d annual report all the information called for in the resolution of the board of directors.

The committee believes that there should be a complete and thorough reorganization in the methods of accounting in the various departments of the company throughout the entire system, with proper classification of expenditures of all classes, and fixed rules and regulations pertaining to same, and suggests that a comptroller be employed, with authority to direct the method of keeping the accounts and making the reports.

Birmingham, Sheffield & Tennessee River.—The proposed extension from Jasper, Ala., the present southern terminus, has been surveyed to a connection with the Georgia Pacific, and the survey will be continued south.

Black River Falls & Eastern.—The surveys for this road have been completed, and the right of way has been secured. It is claimed that construction will begin by Sept. 1. It is to run from Black River Falls east to a connection with the Green Bay, Winona & St. Paul, about 25 miles. Few bridges will be necessary and the grades will be light. H. H. Price, of Black River Falls, Wis., is President, and A. S. Cooper is Chief Engineer.

Briarfield, Blocton & Birmingham.—The company has filed articles of incorporation in Alabama to build a road from a point in Shelby County, Ala., on the line of the East Tennessee, Virginia & Georgia, at or near Montevallo, and thence through the counties of Shelby, Bibb and Jefferson, to Birmingham, with a branch to Blocton, in the county of Bibb, a distance of 80 miles. The capital stock is $2,000,000. The road is to be an extension to Birmingham of the Mobile & Birmingham, controlled by the East Tennessee, Virginia & Georgia, and which is completed from Mobile to Marion Junction, 149 miles, where it connects with the East Tennessee, Virginia & Georgia, whose road will be used north 55 miles to Montevallo, from which point the new line will be built to Birmingham. Surveyors are already in the field, and as soon as the route is located and the right of way obtained the contracts for the entire route will be awarded and work commenced.

Burlington, Cedar Rapids & Northern.—The United States Circuit Court at Des Moines, Ia., on May 16, rendered a decision in the case of former bondholders against the company. When the mortgage was foreclosed, by which the present owners of the road came into possession of it, there were holders of some 2,000 bonds who claimed the right to redeem the property. The case has been in litigation for several years and was once practically decided in their favor, but the Circuit Court, last week, on supplementary hearing, decided that all but 59 of the 2,000 bonds were fraudulently issued; that the holders of the 59 could redeem if they desired, but the figures at which they must redeem the property are placed at $11,000,000, so high that it would seem to make redemption virtually impossible. Two opinions were rendered, the majority opinions being by Judge Brewer and Love, the dissenting opinion being by Judge Shiras.

Camden & Alexandria.—It is claimed that contracts will be let about July 1 for grading this road, and that track laying will begin in September. It is to extend from Camden, Ark., via Eldorado to Alexandria, La., about 175 miles. The maximum grade is 1 per cent., and the maximum curve is 6 degrees. C. C. Henderson is President and W. R. Smith is Chief Engineer, both with office at Camden, Ark.

Canadian Pacific.—It is stated that the company has agreed with the Canadian government to build a branch line from Brandon southwest 100 miles to the Souris coal district, and also an extension of 25 miles from the present terminus of the Manitoba & Southwestern to a junction with the projected Souris branch, and that the condition on which the company undertakes the construction of these lines is the grant of 6,400 acres to the mile.

Cape Fear & Yadkin Valley.—The survey will soon begin, it is reported, for an extension of the Millboro branch from Millboro, N. C., south to Ramseur, N. C., formerly Columbia Factory, N. C.

Central Iowa.—J. E. Dudley, Receiver, applied to Judge Gresham, last week, to be relieved of his duties as Receiver, as the property of the road had been transferred to the reoganized company, the Iowa Central. His report of the road's operations was admitted and an order issued relieving him of his duties as Receiver, and giving the Iowa Central control of all the property of the Central Iowa.

Chattanooga Southern.—This company, already organized in Tennessee, has filed articles of incorporation in Alabama. The proposed road is to run from the northeast boundary of the state in Cherokee County, on the state line between Alabama and Georgia, at or near the town of Alpine, running thence by or near the town of Centre and Round Mountain, thence to Anniston, in Calhoun County. The capital stock is fixed at $1,000,000.

Chicago & Atlantic.—In the United States Circuit Court, at Chicago, this week, Judge Gresham heard arguments for the appointment of a receiver. As the contending parties could not agree among themselves upon a nominee for the receivership, Judge Gresham appointed Volney C. Malott, of Indianapolis.

Decatur, Chesapeake & New Orleans.—Belden & McTighe, of New York, who have the contract for building the first 30 miles from Shelbyville, Tenn., toward Fayetteville, will commence work this or next week. The contract for building the next 76 miles will be let within the next 30 days. The line is to extend from Decatur, Ala., via Fayetteville to Shelbyville, and thence to Gallatin, Tenn., about 142 miles. The preliminary surveys have been made, and the first 20 miles are located. It is expected to complete 76 miles by Feb. 1, 1890. Rails have been purchased for the first 40 miles, and the company is now negotiating for rolling stock.

Denver, Colorado Canon & Pacific.—The company is outfitting for its preliminary survey down the Green and Colorado rivers in Utah and Arizona. A force of 16 will leave Denver for Green River Station, Utah, May 22. The survey will be made by water, five surf boats having been purchased in the East. Cobert B. Stanton has been chosen Chief Engineer.

East & West of Alabama.—The work of changing the gauge of this road from 3 ft. to standard is now progressing rapidly and will be completed as fast as possible. The road extends from Cartersville, Ga., to Pell City, Ala., a distance of 117 miles, and being operated by C. B. Ball as Receiver and Manager. It is stated that several extensions are under consideration.

Evansville & Richmond.—An election to vote aid to the Evansville & Richmond Railroad was held in four townships of Decatur County, Ind., May 15. In three of the townships the aid, amounting to $100,000, was voted. In one township it was defeated.

Fort Worth & Rio Grande.—Grading on the first 12 miles from Granbury, Tex., has been completed and work is now in progress in Erath County. The culverts are being put in and the bridges are in course of erection.

Housatonic.—Both houses of the Connecticut Legislature have defeated the bills granting the petition of this company for authority to build branches east and west from its southern termini, which would virtually constitute a new road parallel to the New York, New Haven & Hartford westward from New Haven. The bill recommended by a majority of the Railroad Committee, which allows any railroad to build branches from its main line or from any of its leased lines, provided the construction of such branch is found by a judge of the Superior Court, after due publicity, to be of public necessity and convenience, was passed by both houses, the vote in the Senate being almost unanimous.

Illinois Central.—The net earnings from traffic for the first four months of 1889 and 1888, April, 1889, being estimated, is as follows:

	1889.	1888.	Inc.
Miles	2175	1953	222
Gross earnings	$4,093,302	$3,586,780	$506,522
Oper. exp., taxes, etc.	2,694,958	2,692,228	2,730
Net earnings	$1,398,344	$894,552	$503,792

The Dubuque & Sioux City reports its gross earnings for the first four months of 1889 and 1888, to have amounted to $504,722 in 1889, a decrease of $13,261; including the Cedar Falls & Minneapolis they amounted to $530,937, a decrease of $14,302.

Kansas City, Fort Smith & Southern.—Right of way has been secured for this road from Fort Smith, Ark., north through the western part of Washington and Benton counties to Prairie Grove and Sulphur Springs, about 30 miles, and the subsidy asked to bring the road to the former place has been raised. Surveyors are setting grade stakes above Sulphur Springs.

Kansas City, Lawrence & Wichita.—Chartered in Kansas to construct a road from a point on the main line of the Kansas City, Wyandotte & Northwestern, near Tonganoxie, Leavenworth County, southwesterly through the

counties of Leavenworth, Douglass, Shawnee, Osage, Lyon, Chase, Greenwood, Butler, and Sedgwick to the city of Wichita. The estimated length is 157 miles. The capital stock of the company is $3,000,000.

Kentucky Midland.—A force of 150 men began work on the road near Paris, Ky., last week. There are now 500 men at work on the road between Paris and Georgetown.

Lake Shore & Michigan Southern.—The statement of earning and expenses for the quarter ending March 31 shows:

	1889.	1888.	Inc. or Dec.	
Gross earnings	$4,222,818	$4,279,497	D.	$56,679
Operating expenses	2,721,324	2,562,837	I.	158,487
Net earnings	$1,501,494	$1,716,660	D.	$215,166
Other income	69,727	33,744	I.	35,983
Total	$1,571,221	$1,750,405	D.	$179,183
Fixed charges	1,074,727	1,061,035	I.	13,692
Surplus	$496,494	$689,370	D.	$192,875
Cash	2,255,096	2,622,073	D.	356,977
Profit and loss sur	10,474,639	10,098,093	I.	376,546

Net earnings in 1887 were $1,792,188, and surplus $760,023. In 1886 net earnings were $1,421,822, and surplus $337,496.

Lehigh & Hudson River.—This road, which is the connecting link between the Pennsylvania system and the Poughkeepsie Bridge lines, has entered into a 100 years' contract with the Pennsylvania for a mutual traffic arrangement.

Louisville, Evansville & St. Louis Consolidated.—This road has been formed by the Louisville, Evansville & St. Louis, the Illinois & St. Louis, the Belleville, Centralia & Eastern, the Venice & Carondelet and the Huntingburg, Fall City & Cannelton companies. The capital stock is placed at $1,300,000 preferred stock and $3,790,747 common stock.

Louisville, New Orleans & Texas.—The grading on the Bayou Sara branch is about completed. Tracklaying is progressing rapidly and trains will be running from Slaughter to Bayou Sara, La., in 30 days. The line is 17 miles long. Garvey Bros. & Kelly, of Memphis, are the contractors. The extension of the "Bolivar Loop" from Rosedale, Miss., its present terminus, to Coahoma on the main line, 45 miles, has been located and contracts were let May 8 to Fudge & Strang and W. O. Flinn & Co., of Memphis, Tenn. Construction will begin at once and it is expected to have the grading completed in 90 days. Dr. J. F. B. Hillhouse, of Memphis, Tenn., General Superintendent of Roadway, is Chief Engineer of construction.

Mexican Roads.—The government has granted a charter for a railroad from Matamoras, Mex., to Bagdad, at the mouth of the Rio Grande, with a subsidy in bonds.

Missouri, Kansas & Texas.—At the annual meeting, held in Parsons, Tex., May 15, H. K. Enos, chairman of executive committee, made a report of the actions of the committee during the year, and recommended that as it was not thought that the road could earn more than $1,200,000 per year over and above operating expenses, that the bond and stockholders be made acquainted with the fact with a view of scaling down the indebtedness so as to come within, or near, that limit.

Nevada Pacific.—A charter for a company of this name has been filed in Nevada by stockholders of the Utah Central to build a road extending 500 miles to the Utah line and to Ash Meadows on the California line. The capital stock is $7,500,000.

New Roads.—A. A. Anderson, of Bowling Green, Va., is interested in a proposed road from that point to connect with the Richmond, Fredericksburg & Potomac at Milford, Caroline County.

L. A. Dobbs, of Lebanon, Ala., and others have chartered a railroad to extend from Summerville to Guntersville, Ala., via Fort Payne, Ala., and Lebanon, Ala.

A company is being organized in Kentucky to build a road from Owensboro southwest to Sebree, a distance of about 20 miles. The stock is being subscribed by residents along the proposed line.

Northern California.—The Southern Pacific is conducting negotiations with this company for the control of its road, which extends from Oroville to Marysville, Cal., a distance of 27 miles. It has not yet been decided whether the control will be obtained by a lease or by actual purchase.

Northern Pacific.—The contract has been let to Greene & Keefe, of Helena, Mont., for building the line from Canon House, four miles east of Gallatin, to Butte, Mont., a distance of 70 miles. The line has been located and cross-sectioned and passes from Canon House up Jefferson River to Jefferson Island; thence up Homestake Pass to Butte. On the mountain section, 25 miles, the maximum grade is 116 ft., and on the valley section, 45 miles, the maximum grade is 30 ft. Winston Bros., of Minneapolis, who have the contract for the line from Little Falls, Minn., to Staples Mills, 34 miles, have the work well under way, and it is expected that it will be opened for traffic by Sept. 15. Most of the grades on this line are 26 ft. to the mile. It will shorten the main line of the Northern Pacific 27 miles. When the new line to Butte and this latter line are both completed, the Northern Pacific will have the shortest line from St. Paul to Butte, by 120 miles.

Ohio Valley.—The extension from Henderson, Ky., to Evansville, Ind., 14½ miles, has been placed in operation, and through trains are now running from Hopkinsville. Work will probably soon commence on the extension from Hopkinsville south to Princeton, 30 miles. The contract has not yet been let.

Oneida, Oneonta & New York.—This company has been organized in New York to build a road from Oneida via Union, Knoxboro, Oriskany Falls, Hubbardsville, Edmeston and Morris to Oneonta. The capital stock is $650,000. Preliminary surveys have been made and a charter will soon be applied for. W. F. Randall, of Oneida, is Chief Engineer.

Ontario, Carbondale & Scranton.—Lathrop & Elsworth, of Corning, N. Y., have the contract for building this extension of the New York, Ontario & Western, from Hancock, N. Y., to Forest City, Pa., and Dowling, Kennedy & Co., of Binghamton, N. Y., have the contract for the rest of the line to Scranton. The work is to be completed Jan. 1, 1890. The total length of the line will be 54.37 miles. From Hancock to Forest City it passes through heavily timbered country and an agricultural district which will also afford traffic from stone quarries on the route. Between Forest City and Scranton it runs through the Wyoming Valley, and will afford facilities to a large number of coal mines, many of which have no present rail outlet. The Wyoming valley produced last year over 22,000,000 tons of anthracite coal, and the tonnage which the new line will give to the Ontario & Western it is expected will place the latter line well up among the anthracite coal carriers. The local business in the valley will also be a very valuable one, the line running between Forest City and Scranton through mining towns and villages, and having connection at Scranton with the Central of New Jersey and other lines to the south and west. Scranton is a city of nearly 100,000 inhabitants and the population contributing to this new line is estimated at nearly 250,000.

Oregon & Washington Territory.—Grading is in progress on the extension of the Pendleton division from the present terminus at Fulton to Pendleton, Or.

Pasco, Goldendale & Eastern.—The first preliminary survey between Pasco and Goldendale, W. T., has been completed. The distance is about 105 miles, and an easy grade is reported on the whole line. The first 10 miles of the route from Goldendale traverses an agricultural section, the next 30 miles, to Bickleton, via Cleveland, passes through yellow pine forest; from this point the glade is used as a means of descent into the Horse Heaven country; then through the branches of the Badger canyon to Kennewick and thence to Pasco. R. A. Habersham, of Portland, is Chief Engineer.

Pennsylvania, Poughkeepsie & Boston.—Fifteen hundred men are at work at various points along the line of the road between Deckertown, N. J., and Slatington, Pa. The road is graded, and the rails are laid between Portland and Penn Argyle, and between Pine Island and Pelletown. The work of construction is progressing rapidly.

Pittsburgh, Beech Creek & Eastern.—Chartered in Pennsylvania with a capital stock of $1,500,000 to build a road 150 miles long from Mill Hall, Clinton county, through Centre, Clearfield, Jefferson, Indiana, Armstrong, Clarion and Butler counties to Butler. Samuel Nevins, of Philadelphia, is President of the company.

Pittsburgh, Youngstown & Ashtabula.—The annual meeting of the stockholders of the road was held at Youngstown, O., last week. The report of the operations of the road for the year 1888 shows: Total income, $1,088,336; expenses, $669,330; net, $419,006; total charges, $411,367; surplus, $7,639; balance to credit of income account, $104,722; total credit of income account Dec. 31, 1888, $112,361. No addition was made to capital account, either in bonds or stock. The company has no floating debt. A resolution was adopted to complete the line from Lawrence Junction to Wampum Junction, Pa., a distance of 5 miles, connecting with the Pittsburgh, Fort Wayne & Chicago, and giving a through line between the lakes and Pittsburgh independent of the New Castle & Beaver Valley road.

Quebec Central.—The company is said to have completed all arrangements for commencing work on the proposed extension from St. Francis, Que., to Moose River, Me., about 65 miles. St. Francis is about 20 miles north of the boundary line. It is hardly expected to complete the line to Moose River this year.

Richmond & Allegheny.—The sale of the road has been confirmed by the Circuit Court in Richmond, Va., and the deed issued to the purchasers. The new Richmond & Allegheny Company was formed with Erwin Davis, of New York, President. The road was then turned over to the Chesapeake & Ohio, by which it will be operated.

Roanoke & Southern.—That portion of this company's road between Winston and Salem and Walnut Cove, N. C., 18 miles, has been opened for traffic with the following stations: Winston and Salem, Ogburn, Walkertown, Dennis and Walnut Cove. The depot at Winston and Salem is adjacent to the Richmond & Danville depot. At Walnut Cove connection is made with the Cape Fear & Yadkin Valley, and both roads use the same depot.

Rogers & Summit.—The company will probably soon take definite action regarding the proposed extension to Reidsville, Ga., from Stillmore. The extension will be about 53 miles long and through some of the finest timber lands in the state. As yet, however, no rights of way have been secured for the extension, and no time has been set for letting contracts. The road is now built, and in operation from Rogers south to Stillmore, Ga., about 32 miles. This part of the line was built by local capital, but in the extension to Reidsville the company will secure outside capital.

St. Louis & Birmingham.—Engineers are surveying from a point five miles northwest of Florence, Ala., through Lawrence and Wayne counties in Tennessee, and across the Tennessee River in Wayne County to a point yet to be decided upon.

St. Paul & Duluth.—The work of double-tracking between St. Paul and White Bear Lake is being pushed by the contractors, Messrs. Woods & Lovejoy and D. L. Billingsley, of Minneapolis, who have three steam shovels at work.

Sandusky, Columbus, Lake Erie & Southern.—A meeting of stockholders was held in Sandusky, Ohio, last week. It was decided that a survey of the proposed line between Sandusky and Columbus be made at once.

Shawnee & Muskingum River.—This road will be opened for freight and passenger business June 1, but freight trains began running this week, the road being fully equipped with freight cars and locomotives. The line is an extension of the Zanesville & Ohio River, and is completed from Shawnee Junction, on the Zanesville & Ohio River, 23 miles south of Zanesville, to Shawnee, Ohio, on the Baltimore & Ohio, crossing the Toledo & Ohio Central at Corning. There is also a branch nine miles long from Buckingham, five miles west of Corning, to Gloucester, connecting with the Kanawha & Ohio. J. R. Andrews, of Zanesville, is General Superintendent, and G. F. Gardner is Superintendent of Transportation.

Somerset.—Bids are now being received for building the extension from Carratunk Falls to Bingham, Me., a distance of seven miles. The working surveys are still in progress, but are nearly completed. The line has been bonded to complete the work and the bonds have been placed.

South Atlantic & Ohio.—It is stated that the company will at once commence work on the extension of its road to Big Stone Gap, Va. The company now has 38 miles of road completed.

South Carolina.—The attorneys in the case of H. P. Walker against the South Carolina Railroad, at the suit of the first mortgage bondholders on May 17 filed a petition in the State Court at Charleston for a foreclosure of the mortgage. The petition had previously been filed in the Federal Court, but was there denied. The object of the suit is to get in a foreclosure of the first mortgage ahead of the second mortgage of the reorganized road.

Southern Pacific.—Tracklaying on the extension from Victoria to Beeville, Tex., a distance of 55 miles, has been finished to Goliad, and regular trains will soon be put on between that point and Beeville. Work is in progress on the rest of the line.

State Line & Denver.—Charter filed in Colorado to build a road from a point in Mesa County, on the west line of the State of Colorado, and running easterly and up the valley of the Grand to Glenwood Springs, and east through the counties of Garfield, Eagle and other counties to Denver. Branch lines are intended to Aspen and also through Gunnison County to Pueblo. The capital stock is $8,500,000, of which $7,500,000 is preferred stock.

Sulphur Springs & Red River.—This company, noted last week, has filed articles of incorporation in Texas, with a capital stock placed at $500,000, to build a road from Sulphur Springs, Hopkins County, via the town of Cooper, Delta County, to Red River, at or near Ragsdale, Fannin County, 60 miles through the counties of Hopkins, Delta, Lamar and Fannin.

Union Pacific.—The gross earnings of the entire system for March were $2,751,008, a decrease from the same month of last year of $542,572; net earnings, $921,172, a decrease of $500,517. For the three months to March 31 the gross earnings were $7,496,235, a decrease from the same period last year of $518,188; net earnings, $1,970,318, a decrease of $614,722.

Utah, Nevada & California.—Incorporated in Utah with a capital stock of $20,000,000. The road will pass from Emery County through Utah, Nevada and California to San Diego, and will be about 1,200 miles long.

Wabash.—The report for April shows receipts of $707,251 and disbursements of $791,485; of the latter amount $197,300 was for taxes. Since Jan. 1 the receipts have been $21,670,690 and expenditures $21,474,279. Balance on hand April 30, $196,411.

Western Maryland.—Tracklaying on the extension from near Gettysburg, Pa., to Blue Ridge Summit, Md., 15 miles, was completed May 19, and it will soon be opened for traffic. It has been fully described in these columns.

TRAFFIC.

Traffic Notes.

There is a mild passenger rate war between Mobile, Ala., and New York City.

The roads between Chicago and the Missouri River have come to an agreement on berth rates in second class sleeping cars.

The rate on iron ore from Lake Erie ports to Pittsburgh has been reduced by joint action of the railroads from $1.25 to $1.05 per ton.

The New York, Pennsylvania & Ohio has resumed the sale of one-way party tickets at 2 cents a mile, and it seems that a number of other roads are now selling tickets of that kind.

A trainload of rice from the Pacific coast (Vancouver) for Chicago was recently taken by the Canadian Pacific to Port Arthur, on the north shore of Lake Superior, and there delivered to a propeller for Chicago.

The Cleveland Inspection Bureau found under-billed freight during the month of April to the amount of nearly 5,000,000 lbs., being 23 per cent. increase on shippers' weights. The Buffalo Bureau found an increase of 10 per cent.

The jurisdiction of the Western Railway Weighing Association and Inspection bureau has by agreement been extended to include business to and from Colorado and Utah points, and Superintendent Carman will soon visit Denver, Pueblo, Trinidad, Salt Lake and Ogden to arrange the service.

The Railroad Commissioners of Missouri have ordered a reduction in the rates on coal over the Chicago & Alton from Higginsville, Mo., to Kansas City, which is now 75 cents per ton. The shippers claim that they were shut out from competing in the Kansas City market and the Commissioners have ordered the rate reduced to 55 cents, equal to 1 cent per ton per mile.

A Table of Seals.

Mr. Thomas E. Walker, General Claim Agent of the Southern Railway & Steamship Association has, by direction of the association, compiled a list of all the freight car seals used by the roads of the association, and has added a number of lists furnished by other lines, making a pamphlet of over 50 pages. Many of the Southern roads furnish the conductors of way freights with sealing tools, which are apparently used to seal cars taken on at small stations. A considerable portion of the seals represented in the list are stamped with the full name of the station. Where the surface of the seal is large enough to admit of letters which can be easily read, this is of course a considerable advantage, especially to inspectors of foreign roads, over the plan of numbering, which is generally intelligible only to those who are familiar with the road on which the sealing was done. We notice only one unintelligible seal, which is that used at a certain wharf; the seal is stamped simply with the word "Wharf," which is about as definite as to put on the name of John Smith or the autograph of the king of the Cannibal Islands. The kind of seal used is not indicated except in the case of one road, which uses Sully's patent paper tag seal.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all lines for the week ending Saturday, May 18, amounted to 40,633 tons, against 41,935 tons during the preceding week, a decrease of 1,302 tons, and against 35,318 tons during the corresponding week of 1888, an increase of 5,315 tons. The proportions carried by each road were:

	W'k to May 18.		W'k to May 11.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	3,553	8.8	4,440	10.5
Wabash	3,991	9.8	4,013	9.5
Lake Shore & Michigan South.	7,165	17.6	5,770	13.7
Pitts., Ft. Wayne & Chicago	4,958	12.2	5,109	12.1
Chicago, St. Louis & Pitts	5,428	13.4	6,264	14.9
Baltimore & Ohio	2,731	6.7	3,432	8.1
Chicago & Grand Trunk	6,464	15.9	6,007	14.8
New York, Chic. & St. Louis	2,311	5.7	2,907	6.9
Chicago & Atlantic	4,032	9.9	3,993	9.5
Total	40,653	100.0	41,935	100.0

Of the above shipments 2,368 tons were flour, 10,143 tons grain, 1,865 tons millstuff, 3,724 tons cured meats, 1,871 tons lard, 8,826 tons dressed beef, 323 tons grass seed, 1,168 tons butter, 1,323 tons hides, 230 tons wool, and 6,624 tons lumber. The three Vanderbilt lines carried 32·1 per cent., while the two Pennsylvania lines carried 25.6 per cent.